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AMERICAN POTASH INSTITUTE, INC.

INVESTMENT BUILDING **WASHINGTON, D. C.**

Better Crops with PLANT FOOD

The Whole Truth—Not Selected Truth

R. H. STINCHFIELD, *Editor*

Editorial Office: Investment Bldg., Washington, D. C.

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American Potash Institute, Inc.
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A NATURAL "STOP" FOR THE MIDSUMMER MOTORIST.

Better Crops with PLANT FOOD

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VOL. XXII WASHINGTON, D. C., JUNE-JULY 1938 No. 6

You can define your gardening

Landsc(r)aping

Jeff McDermid

I AM engaged in the ancient problem of summertime, i. e. and to wit, namely: whether to secure a good garden for a little money, as the books aver, or to spend good money for a little garden, which I usually do. One might infer that a chap with the soil of centuries of agriculture bred in his bones and under his finger-nails ought to produce a super-abundance of herbiferous garlands and esculent edibles from a plot of rich alluvia, not too replete with broken beer bottles and scrap iron.

It is not stretching the imagination over much to vision the joy with which a sedentary classical scholar like myself should awaken with the woodpecker's rap on the roof to grab his breeches and seize the spade for a foray in the realms of botany.

Whilst the season is young and the mornings dewy, our intentions in the direction of an early partnership with nature seem logical and simple to achieve. But as the warmth of July dawns finds you wringing perspiration from your limp pajamas, those bookish allurements of winter garden studies grow dim in the grip of ennui, or even ordinary laziness.

Not being a born fisherman, I detest the fellow who abandons the row boat and the reel for a measly purchase at the nearest market on his dissappointed journey homeward. Being a gardener, however, I see no harm in eking out my laudable vegetative ambitions with

a basketful of beans or a head of cabbage produced by a successful muckland artist, or depending on the florist for enough sweet peas to make a respectable smell around the house.

I eschew all alibis and renounce all cheap excuses. There are no vicious boys to tramp the daylights out of my dahlias. Nary a neighbor keeps a dog to leg-it over my choicest evergreens, and the ordinance under which I pay taxes abolishes that common nuisance of the home seeder—the clawing, four-toed hen.

On the contrary, I live in a community where the best of advice can be had without asking for it, and several renowned doctors of plant structure and deans of landscape carpentry are or have been almost clubby with me betimes. Moreover, my long list of erudite acquaintances includes men of discernment in matters of manure and experts in soil-saving dams and damn-saving soils. To each and all of them I dedicate this treatise—sans malice and sans reproach.

HAD I been as faithful with my hoes and harrow as they were in writing bulletins, the result would have been too prosaic for these captivating pages. Unfortunately I have two neighbors who never read anything touching upon the agricultural or botanic arts, and yet their ardent toil is recompensed by a veritable rainbow of gorgeous bloom and a surfeit of salubrious saladry and kale. Not that I have the slightest envy in my make-up, but I feel hurt over the success of those who have never courted the counsel of my wise and helpful professional friends. I spend hours wondering why nature flouts the men of learning and caters to clodhoppers with more sweat than sense.

I owe these savants a modicum of praise for what they have contributed. For a time I was the editor of the farmers' almanac and gardeners' guide. With the rare help of my technical friends who relished giving free advice, I was able to relay countless answers to perplexed readers at no cost to myself or our periodical. I trust that the cost thereof to readers was not any greater than one or two seasons' setback at least, as I usually added only a *few* instructions of my own to the tested formulas prescribed by the faculty. I shall touch upon a few of those old notes and comments.

AFTER the first front fence is decided upon comes the matter of the sides and back, and these depend a good deal on your neighbors," the sentence says. My experience is that if you have congenial neighbors who like to talk about the same things you do, and who do not toss mean remarks, old cans, and dead cats too frequently upon your property, then no hedge is needed. For the other kind you need a cute combination of annuals and perennials to afford permanent barriers. I suggest using blackcap brambles planted a foot apart and well fertilized, and a generous spring combination seeding of beggar lice, poison ivy, sunflowers, and hemp, or any set of annuals that are famous for blocking both visits and vision. If you can get through this breastworks some night during the siege and sow rock salt on his verbenas, the season will truly be a successful one.

"It may be that you prefer a wide expanse of lawn running behind your house with only a few cultivated garden plots." This advice is about as complete as giving one an alternative of dying through overwork or overworry. It all depends on whether you love to push the mower for time and a half or grub around on your shins with a trowel. I was raised in the dear old days when both lawns and cow pastures were gifts of the gods, and anybody who tried to fertilize either beyond the natural supplies they got from quadrupeds was considered fit to be candidate for office on the Prohibition ticket. Nowadays a prudent householder is in a stew all the time with

lawn troubles. He must keep it growing with top-dressing and he has to give the boy a dressing down to keep it cut.

"FROM the first of June to the middle of September the wise gardener will undertake only what he can do in *half* his leisure time." It may be a trifle hard to figure out exactly what half your leisure time amounts to.

One is so apt to spend more than half of the allowance of leisure on the links, or over at the neighbors sampling mint julep, or showing him how to prune his potatoes. So I suggest that this be left to the wife. She keeps better track of the leisure of her spouse than any other person, and she can also cut it in half much quicker.

"You will have gifts of plants from neighbors and old friends who are touched by your earnestness and industry." Yes, indeed, plenty, such as they are. I have a neighbor lady with an expansive and expensive garden, and every time we go up there to admire it she finds some specimen to load me down with. At the insistence of my frugal wife and with a certain Scotch instinct besides, I totter home with bushel baskets of *Nepeta mussini, Thalictrum* or *Henchera,* and work beneath a waning moon and amongst a bevy of beetles trying to find a decent burial place for them. Then here cometh that doughty dowager who gave birth to my wife, bringing us some cute weeds she located on one of her dizzy rambles—presenting them to us for our wild-flower nook. Luckily none of us have hay fever, because the stuff that woman has unloaded on us accounts for the highest pollen count ever recorded on a suburban sneeze patch.

"AVOID all ugly flower-holding contrivances for your gardens and lawns." After several years of fertile invention and original design, I can second that motion pronto. The list of bizarre effects successively tried on my premises have caused some folks to drive in with patients for the asylum through mistake. They include old cart wheels and auto tires discreetly laid down in sod and planted to moss roses; Uncle Ike's steamer trunk filled with fertility and sown to phlox; rows of old lodge spitoons edging a bed of petunias; an abandoned wire bedspring used to train up sweet peas and morning glories; and a clump of golden glow growing in one of my old hip boots. I had to quit experimenting because the junk dealers woke me up mornings outbidding each other for the salvage. Commercialism interferes with esthetic repose.

"Use care in ordering nursery stock to get hardy, acclimated species and varieties." My usual system is a simple one in regard to planting stock. In midwinter I read all the marvelous ads and put my son to work writing postcards for free catalogs and brochures, using him for this purpose because he is taking night school lessons in English and typing. When the clutter has accumulated I look at the pictures and study the text for hints on how the landed gentry grow their gooseberries. In order to get rid of the pamphlets I loan them to friends. Then when the ground is soft enough to dig, I take a spade and grub-axe and trundle my

(*Turn to page 46*)

Can Sea Island Cotton Return to Georgia?

By E. C. Westbrook

Cotton and Tobacco Specialist, Agricultural Extension Service, Athens, Georgia

GEORGIA produced approximately 900 bales of Sea Island cotton last year. This compares with a production of 71 bales for 1936. The State formerly grew 50,000 to 75,000 bales annually. In 1918 Georgia planted 129,000 acres in Sea Island cotton, from which 34,000 bales were harvested. A total of 65,000 bales was produced in Georgia, Florida, and South Carolina in 1918. In 1920 the total production for Georgia, Florida, and South Carolina was only 2,000 bales.

Since 1920 production of this type of cotton has been too small to be of commercial importance and the advent of the boll-weevil caused farmers to abandon the crop. It is slower in maturing than short cotton, and the bolls are softer, thereby making it more susceptible to boll-weevil injury.

There have been attempts from time to time to revive the production of Sea Island, but not until the successful crop in Florida in 1935 were there any encouraging signs. The 71 bales produced in Georgia in 1936 were from seed distributed by the U. S. Bureau of Plant Industry. In order to give a more definite picture before the advent of the boll-weevil, we give below Georgia production by counties for 1911:

Appling	4,590
Bacon	0
Berrien	11,535
Brooks	2,586
Bulloch	9,268
Candler	0
Clinch	1,049
Coffee	8,372
Colquitt	2,067
Echols	530
Emanuel	141
Evans	0
Lowndes	11,819
Pierce	5,585
Tattnall	9,066
Ware	768
Wayne	3,204
All other	2,324

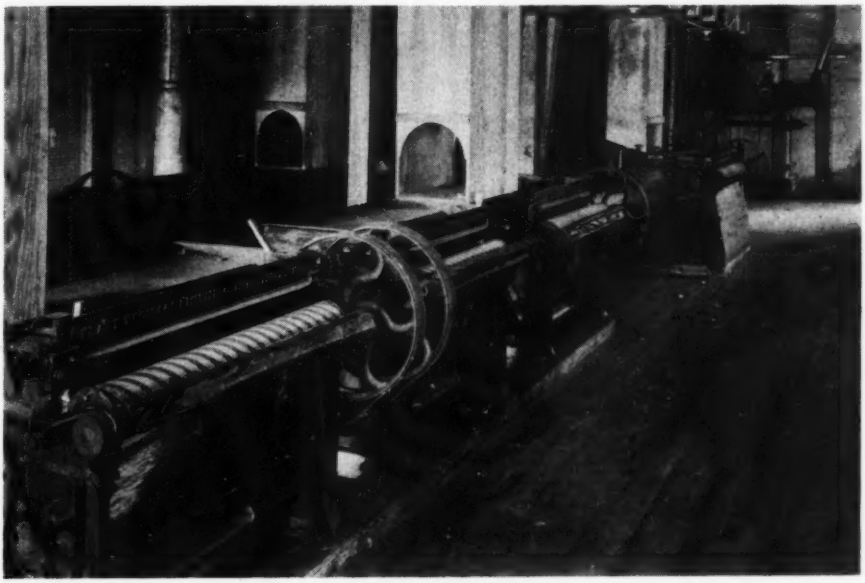
It is estimated that in 1937 between 4,000 and 5,000 acres of Sea Island cotton were planted in Georgia. Enthusiasm at the beginning of the year ran high, because the prospects for an excellent crop were good. There was also a decided revival of interest among a number of manufacturers, both domestic and foreign. Sea Island cotton was planted in approximately 40 Georgia counties distributed all the way from the Alabama line to the Atlantic coast.

Georgia was visited by a heavy infestation of boll-weevil, and this, combined with almost daily rains from the latter part of July until September, caused a much smaller yield than was anticipated earlier in the season. The weather and weevil conditions also resulted in the production of a considerable amount of low-grade cotton. Despite the unfavorable conditions, many growers came through with very successful crops.

The price for Sea Island cotton varied from 19 to 25 cents per pound. The

major portion of the crop was sold for approximately 22 cents per pound.

The old roller gins which were used to gin Sea Island cotton have been furnished by the Triple-A was used on 100 bales ginned at Valdosta. About the biggest objection made to the use of the cotton bagging was that it was



Inside view of a Sea Island Cotton Gin owned by The Southern Cotton Oil Company, Valdosta, Georgia.

abandoned since 1920. Some of this old equipment was pulled out of old gin houses and the rollers recovered and put in condition to gin the 1937 crop. The towns where Sea Island gins were operated and the number of bales ginned at each place are as follows: Valdosta, 376; Mershon, 189; Baxley, 182; Offerman, 72; Savannah, 50; Nichols, 35; and Willacoochee, 18. Most of the gins used were of the Foss double roller type, although there were a few English Platte single roller gins used. A total of 922 bales, averaging approximately 400 pounds each, was ginned at the seven gins. It is estimated that of this number between 20 and 25 bales were produced in Florida. There were a few bales produced in Georgia that were ginned on Florida gins.

The charge made for ginning varied from 1½ to 2 cents per pound of lint. The number of ties used on the bale varied from two to six. Cotton bagging 7 to 8 pounds lighter than the sugar cloth bagging used on most of the Sea Island bales.

Incomplete Records

It has been rather difficult to make recommendations as to methods of fertilization and culture which would give the largest yields of Sea Island. Very little of this cotton has been grown for the last 20 years, and records of methods formerly used are very incomplete. Most of the farmers who formerly grew it are somewhat hazy as to the methods they used. Also, conditions under which the crop is grown today are very different from those when it was an important crop in many south Georgia counties.

In addition to the boll-weevil menace, the labor situation has changed. Farm labor today is not as plentiful and cheap as it was before the World War. More labor is required to pick Sea Island

A field of Sea Island Cotton grown by the Coastal Plain Experiment Station at Tifton, Georgia.

cotton than is required for short cotton. The Sea Island bolls are smaller, and more hand labor is required in sunning the cotton after it is picked and in picking out hard locks, trash, and other foreign matter before the cotton goes to the gin. Sea Island has approximately 25 per cent lint as compared with 35 to 40 per cent for most varieties of short cotton. Sea Island seed weigh approximately 40 pounds to the bushel as compared with 30 pounds for short cotton seed. Therefore, the turnout at the gin is not as good as for short cotton.

The quality of the fiber is the finest of all cottons. It is long, fine and silky, and very strong. The Seabrook strain was planted in Georgia. This strain has a staple 1½ to 1⅞ inches in length. Sea Island cotton is used in making thread, laces, and a variety of fine fabrics.

Made Thorough Survey

The 1937 season was very discouraging for a large percentage of Georgia farmers who planted the crop. Despite the fact that many farmers obtained very small yields, some farmers came through with very satisfactory yields. Believing that there were some very definite reasons why they made good yields while others made very poor yields, we set out in December to find out those reasons. A survey was made in which detailed records were obtained on about 50 crops in half a dozen counties. The yield for the crops studied varied from 9 pounds to 244 pounds of lint cotton per acre.

Samples of soil were obtained from the 50 crops of Sea Island studied. Micro-chemical analyses were made of the samples in which determination was made for the pH, or acidity, the total nitrates, and available phosphoric acid and potash. These and other data were tabulated and are shown in table I.

In analyzing the fertilizer treatment, we find the amounts and kinds of fertilizers used are not correlated as closely with yield per acre as might be expected. The principal reason for this, no doubt, was the very rainy season and the heavy infestation of boll-weevil. One of the most significant things which we learned from the survey, and which is not shown in table I, was the difference in yields on various soil types. The heavy Tifton pebble soils were outstanding. Most of the successful yields were produced on such soils. This was true for all the counties surveyed. This does not mean that it was the only soil type

(*Turn to page 38*)

Potash Is Needed In Southern Illinois

By Fred J. Blackburn

Farm Adviser, Salem, Illinois

FOR the past 7 or 8 years farmers in different parts of Marion County, Illinois, have been complaining of something wrong with their corn. Some thought the subnormal growth was due to insects or diseases, and others thought it might be a soil condition. And yet it seems that most of these farmers who had trouble reported it was on what they considered some of their best soil on the farm. Usually the affected corn field would produce a relatively large crop of wheat or oats, but failed to produce corn.

In 1934 I was called out to the farm of R. L. Murray to see whether I could tell what was the matter with his corn. In 1932 Mr. Murray had pastured sweet clover, following it with wheat in the fall, and the next year planted the field in corn. The corn was sickly looking, small, and in many parts of the field would produce practically no yield.

Since Mr. Murray has kept farm accounts in cooperation with the University of Illinois for the past 15 years, it has been interesting to study the field history. The soil had been limed, and 1,000 pounds of rock phosphate were applied in 1927. The 1933 wheat crop produced 22 bushels per acre, but the corn the following year averaged only 10 bushels per acre. Mr. Murray reported that he had similar trouble back in 1930 on this field, when corn produced only 12 bushels per acre following a 16-bushel wheat crop. In 1931, oats on the same field made 63 bushels. After the 10-bushel yield of corn in 1934, Mr. Murray produced a fair crop of oats and soybeans on the field, followed in 1936 by a yield of 28 bushels of wheat.

By that time we had diagnosed this Murray field as being deficient in available potash, as the corn plants showed typical potash starvation symptoms, that is, yellowing between the veins and

Left: 100 lbs. 0-0-50, right: no potash. Potash fertilized corn was normal green, while the unfertilized rows had lower leaves with brown marginal firing and yellowish streaks between veins. R. L. Murray farm, Centralia, Ill., July 20, 1937.

browning of the edges of the lower corn leaves. This abnormal condition had also been reported on corn from some other farms, including Hopkins' Poorland Farm.

Samples of soil from the Hopkins' Poorland Farm had been sent to the University for analysis in 1935, and the soil was found to be very low in available potash.

On Poorland Farm, the Murray farm, and others, experiments have been conducted recently using potash fertilizers, and some outstanding responses in yields have been obtained.

In 1936, W. A. Hunter, operator of Poorland Farm, applied 60 pounds of muriate of potash (0-0-50) per acre in the hill for corn on a field where a lime-phosphate-legume program had been followed for a number of years. In the center of the field he left a few rows without potash. This same year we also experimented with side-dressing potash along the corn rows after the severe potash starvation symptoms had appeared. The side-dressed corn regained its normal green appearance in a few weeks. However, due to the hot, dry season, the corn was cut for silage and no yield estimates were obtained from this field. An important observation during this hot, dry season was that the normal, green, potash-treated corn did not suffer any more from the drouth than the unfertilized rows. In fact those rows fertilized with potash furnished a much greater amount of corn for silage.

No fertilizer yielded 22.1 bu. 125 lbs. 0-8-24 yielded 54.8 bu. Hopkins' "Poorland Farm," Salem, Illinois, Oct. 29, 1937, showing effect of high-potash fertilizer on strength of stalks and yield and quality of corn.

More comprehensive fertilizer tests

TABLE 1.—CORN YIELDS HOPKINS' POORLAND FARM, SALEM, ILL., 1937

Treatment	Yield per Acre Bu.	Per Cent Marketable Corn	Value per Acre @ 50¢ & 15¢	Fertilizer Costs per Acre	Net Increase Due to Fertilizers
Hopkins no treatment	23.81	93.8%	11.40	.....	.....
LrP —no fertilizer	22.92	92.8	10.88	.....	.....
" +125 lbs. 0–0–50 Hill	54.72	97.5	26.91	$2.67	$13.55
" +125 lbs. 0–20–0 "	33.09	94.0	15.87	1.62	3.75
" +125 lbs. 0–20–20 "	50.69	95.3	24.49	3.19	10.98
" —no fertilizer	22.14	87.9	10.13	.....	.....
" +125 lbs. 0–8–24 "	54.80	97.0	26.90	2.47	14.30

comparing different fertilizer grades were conducted in 1937 on several farms. The yields in the test on Poorland Farm are shown in Table 1.

A similar fertilizer comparison was made in the R. L. Murray field whose crop history was described previously. The data are shown in Tables 2 and 3.

TABLE 2—CORN YIELDS, R. L. MURRAY, CENTRALIA, ILL., 1937

Treatment	Yield per Acre Bu.	Percentage Marketable Corn	Value per Acre* @ 50¢ & 20¢	Fertilizer Costs per Acre	Net Increase Due to Fertilizers
No fertilizer	12.31	49.2	$ 4.28	.....	.....
100# 0–0–50 Row	58.84	97.5	28.96	$2.34	$22.34
123# 0–8–24 "	56.24	98.3	27.85	2.44	20.09
115# 0–20–0 "	37.00	91.3	17.55	1.49	10.37
123# 0–20–20 "	53.57	97.6	26.41	3.14	17.11
100# 3–14–6 "	51.37	96.8	25.17	2.15	16.39
No fertilizer	17.47	68.9	7.10	.....	.....
100# 3–14–6+6 T. Manure	58.30	98.0	28.79	12.65	9.04

* Values: marketable corn 50¢, poor quality corn, 20¢.

A locally adapted blue and white variety of corn called "Johnny Hill" was used in this test. This variety is somewhat resistant to chinch-bug injuries and is well adapted to the soils of the territory. The corn was drilled, and the fertilizers were applied in the row with the attachment on the corn planter.

All potash-containing fertilizers made a marked improvement in the growth and the appearance of the corn through the season. The unfertilized rows and those with phosphate alone (0-20-0) showed marked potash starvation symptoms, yellow streaked leaves with the brown marginal firing. The potash-starved stalks were weak and died prematurely. Note in Table 3 the percentage of down and leaning stalks. The unfertilized areas and the 0-20-0 plot had the greatest percentages of down stalks. The percentages of leaning and down stalks decreased as the amounts of potash supplied by the fertilizers increased. The 3-14-6 supplied some potash and increased the yield profitably, but the amount of leaning stalks was quite large in comparison to the plots receiving higher potash mixtures. The 3-14-6 furnished enough potash to start the crop, but not sufficient to mature it properly. The combination of 3-14-6 and 6 tons of manure produced about the same yield as 100 pounds of muriate of potash (0-0-50).

TABLE 3—LEANING AND DOWN STALKS, R. L. MURRAY FARM, 1937

Fertilizer Treatment	Per Cent Leaning Stalks	Per Cent Down Stalks	Per Cent Leaning & Down Stalks
No fertilizer	22.2	39.5	61.7
100# 0–0–50 Row	13.4	6.0	19.4
123# 0–8–24 "	18.7	3.9	22.6
115# 0–20–0 "	33.0	30.6	63.6
123# 0–20–20 "	30.1	4.9	35.1
100# 3–14–6 "	41.9	9.5	51.4
No fertilizer	36.7	30.7	67.4
100# 3–14–6+6 T. Manure	40.4	8.3	48.7

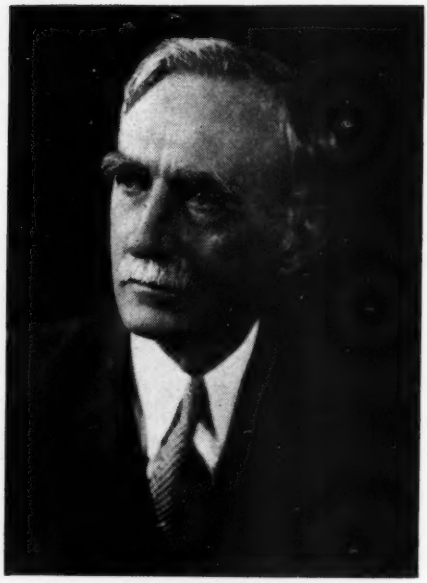
We are not certain as to the response from phosphate in the fertilizer in addition to potash where rock phosphate has been applied previously, as on the Murray field. All through the season the 0-20-20 and 0-8-24 plots looked as if they would produce as much as the 0-0-50 plot. It must be recalled that

(*Turn to page 36*)

A Dean Retires

By H. M. Dail

Agricultural Extension Service, Columbia, Missouri



F. B. Mumford

LONG a prominent figure in the agriculture of the Midwest and nation, Dean F. B. Mumford of the University of Missouri College of Agriculture has announced his retirement effective this fall. He recently passed his seventieth birthday and feels it is time to give up his strenuous administrative duties. Much as they regret the termination of his active leadership, friends of the college believe that his successor, Professor M. F. Miller, veteran soils authority, is well qualified to occupy the position.

Dean Mumford started his long trip in the field of agricultural education and research in 1891, when he forsook the job of managing his father's 400-acre farm to take a position at his alma mater, Michigan State College. As far as the amount of work was concerned, he would have had an easier time had he remained on the farm. Filling the position of an assistant and working toward his master's degree demanded that he begin his tasks in the gray of the dawn and end them by the flickering light of lantern or lamp. His college duties included everything from teaching to assisting with the care of the animals on the college farm. After he obtained his degree, the college gave him the title of assistant professor and raised his salary to $1,000 a year.

A few years afterwards, in 1895, a young college in the Midwest which was seeking an addition to its staff wrote the nationally recognized Michigan school. Today, Dean Mumford will tell you he was recommended for the position largely due to the fact that he supervised the building of an extra straight and sturdy group of fences on the college farm. Be that as it may, he joined the Missouri school as professor of agriculture.

Won Public Confidence

In those early days of the college one was either professor or farm laborer. There were no assistants or even stenographers. Farmers writing in for information received letters in longhand from the professors. Unless writing ability was better then than now, farmers probably were still not very clear about what they were supposed to do.

In common with other comparatively new colleges of agriculture, the Mis-

souri institution was strenuously attempting to convince a skeptical public that it was a worthwhile institution. Most rural people were of the belief that college teachers possessed only "book knowledge" of no practical value. Farmers insisted on farming as had their fathers before them. They strictly followed many misconceptions and fanciful ideas in the tilling of the soil and in raising flocks and herds.

Naturally, there were few students in the colleges then, and only a very few stayed for the full period of study. In 1895, only two students were in the senior class of the Missouri institution. No wonder, when even a national farm magazine carried such a statement as this: "It is the sheerest folly to send a boy to an agricultural college. In the agricultural colleges, boys are taught to be athletes, dudes, clerks, or anything but farmers."

Actually, the early colleges of agriculture were not such as to inspire great confidence. They had meager equipment and had not yet acquired any large body of teachable scientific knowledge. When Mumford began his duties at the Missouri College of Agriculture, the experiment station there was but 7 years old and barely had started investigations. Much of the teaching of livestock judging was done with the use of pictures, not with live animals. In the library of the college at that time there were but three volumes, two of them concerning economic plants and one on domesticated cats.

As the "gay nineties" passed, the Missouri college was making headway toward gaining the confidence of the people of the State, as the steadily increasing student enrollment indicated. However, many persons doubted the value of teaching the agricultural students such things as English, chemistry, zoology, and other subjects which were thought incapable of direct application on the farm. This feeling gave rise to agitation to separate and move the college away from the State university, the belief being that the university's influence affected the "practical" course of study which a college of agriculture should offer. Such a feeling evidently was general because many colleges of agriculture were set up as distinct educational units and had little or no connection with the universities of the State to which they belonged. However, the Missouri agricultural college remained a part of its university.

Authority on Farm Animals

Mumford continued to be professor of agriculture until 1904 and then, following the trend toward specialization, he was appointed professor of animal husbandry. In this position he did much investigational work concerning the breeding of farm animals. He soon became known as an authority on this subject and published an important book entitled "Animal Breeding," which has been a text book in many colleges of the country. The young professor also spent considerable time and energy in building up the college herds, his success being attested by the number of regional and national prize-winners he produced. From time to

M. F. Miller

time, he served as acting dean of the college.

In 1909 he was officially appointed to the position of dean of agriculture and director of the experiment station. As head of this rapidly growing institution he set for himself a triple goal of establishing efficient teaching, thorough research, and a close association of the college with the farmers of the State.

Believes in Research

He believed then and still is of the conviction that sound and careful research is of great importance. He has the research student's love for truth. Once in an experiment concerning the feeding of cattle, a laborer carelessly fed the animals chopped hay containing pieces of wire. As a result several of the animals died. In preparing a report on the experiment, one of his staff asked if he should not eliminate the cattle which had died from the entire account of the experiment. Dean Mumford insisted that the full report be published, since as he said, that showed what actually happened.

Though through the years many of his college's graduates have become outstanding in educational and service fields of national agriculture, Dean Mumford has always firmly believed as he said many years ago, "The most important service that we can render is the training of young men to go back to the farm. The country needs trained men and women for agricultural leadership in the rural community. The field of the college in this endeavor is unlimited."

Since there was no extension service in those years, the college made many of its contacts with farmers through farmers' institutes. These were brief training sessions held on the campus and also in various parts of the State. The dean and other members of the faculty brought to many farmers their first glimpse of scientific agriculture. Mumford had the ability to inspire confidence in his listeners, and he thus built a stronger interest and confidence in the college which he represented. Promotional trains were also popular methods of reaching farmers in those days, and Dean Mumford was a familiar figure on these. In 1913 the extension service was established in Missouri, and for several years he has served as its director, still bearing in addition his duties as dean of the college and director of the experiment station.

In 1917 as the war drums beat loudly, Dean Mumford was asked to take the position of food administrator for Missouri by Herbert Hoover, then

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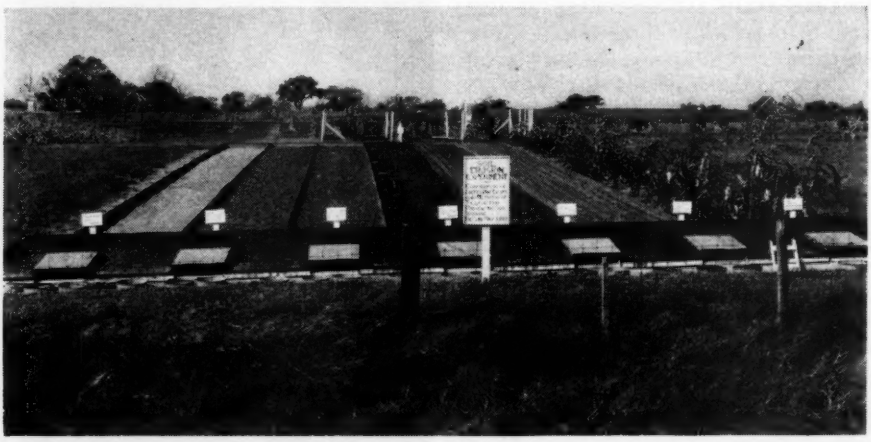

The plots on which important experiments in soil erosion were carried on by Professor Miller. They have been referred to as the "birthplace of soil conservation in the United States."

Orchards Differ in Fertilizer Needs

By F. N. Fagan

Pennsylvania State College of Agriculture, State College, Pennsylvania

DURING the past 35 years many published reports on orchard fertilization have originated from orchard fertilizer tests conducted by the Agricultural Experiment Stations of the United States and Canada. It is needless to list all the work that has been done along this line; suffice it to say that much good to the industry has been the result.

Wide Range of Experiments

This work has been and is now being conducted in orchards planted on soils of many different types and under many different climatic conditions. It is only natural to expect that tree reactions to different treatments would not be the same in all cases. The soil organisms and chemical reactions could hardly be the same month by month in a soil having a surface soil temperature of 32° F. or below for a period of from 12 to 20 weeks, as the reactions would be in a soil where the surface soil is frozen intermittently only 1 to 3 inches deep. Soil bacteria and chemical reactions under such wide temperature differences could not be the same and must play a part in the fertility problems to some extent.

The writer has been fortunate during the last five summers to have been able to visit and inspect, with the owners or managers, about 85 different orchards in eastern United States. These orchards have been located on many different soil types and on many different elevations. The soils in these orchards have been under different systems of soil management in respect to fertilizers, cultivation, and cover crops —different because the "management" has had to "fit" a fertility practice to the needs of a given location and soil. Where the writer has seen orchard failures, and he has visited several, the cause of failure in most cases can be laid at the door of the "management" and not at the door of poor soil or location. The "management" has not been able to see the problems and solve them. Since orchards are being successful under a wide range of general conditions (peaches from Texas into southern Canada and apples from Tennessee and the Carolinas into Canada), we can say that orchard management has met the situation.

I salute with much pride the successful North American orchards. Their problems have been many and big, but good management has made a "Fruit Industry."

One outstanding fact coming from studies of orcharding, be these studies by experiment stations or orchard owners, is that an orchard can not be successful unless some type of soil fertility method is used. For many years nitrogen fertilization has been the method receiving the greatest amount of thought, and justly so, for this element by its very nature is the one that is lost from the soil most rapidly, the one most lacking as orchards become older. But as years rolled on, nitrogen fertilization did not solve the problem completely in all the orchard districts.

It is interesting and of value to see the determined efforts being made now in the studies of plant nutrition deficiencies in relation to orchard tree growth and production. These studies extend from zinc deficiencies in citrus culture through to calcium, magnesium, phosphorus, potassium, and even boron deficiencies of our many other tree fruits.

Using Complete Fertilizers

It is interesting to note the swing, in the eastern part of the United States, to the complete fertilizer recommendations as new studies are reported upon. No one complete fertilizer is going to meet the needs of all orchards, but recent recommendations of formulae extending from (N-P-K) 4-8-4 through 4-12-4, 4-16-4, 9-6-6, 5-10-5, to 10-6-4 are in the right direction in orchard fertilization.

Turning to recent published work on orchard fertilization we find Professors Blake, Nightingale, and Davidson stating in the New Jersey Agricultural Experiment Station Bulletin No. 626 as follows:

"Some orchard soils may be so well supplied with all the common nutrients that they will not show a beneficial response to applications of fertilizers. Other soils may be deficient in one or two nutrients but be well supplied with the remaining elements. In general, however, orchards planted upon Coastal Plain soils will be benefited by annual applications of a complete fertilizer.

"Orchard soils which are fertile enough to support a good growth of cover crops and trees should receive a complete fertilizer of a 3-12-6 formula at the rate of 500 to 1,000 pounds per acre broadcast.

"Orchard soils which are obviously deficient in nutrients and where neither sod, cover crop, weeds, nor trees are making enough growth should receive a complete fertilizer somewhat higher in nitrogen, such as 5-10-5. . . . If the trees and soil are not actually deficient in nutrients, this treatment is definitely unwise.

"Calcium should be regarded as a fertilizer material, rather than as a soil corrective. . . . When the reaction of the soil in the Experiment Station orchards at New Brunswick has been allowed to fall below pH 4.5, these varieties (Delicious and Stayman) have been found to give poor yields and poorly colored fruit. Moreover, it is desirable to grow such soil improvement crops as alfalfa, sweet clover, crimson clover, and vetch in orchards. A soil at a pH of less than 5.5 is unlikely to be favorable for best results with these crops.

"For apple orchards on the Coastal Plain soils in New Jersey, it is recommended that it be made a regular feature of orchard practice to apply a minimum of 1,000 pounds of ground magnesium lime per acre every 2 or 3 years. More than this may be desirable in some instances."

In Better Crops, May 1937, F. W. HofMann of the Virginia Agricultural Experiment Station, states, "If the orchard soil is not strong enough to maintain a good crop of grass or sod it should receive 600 to 800 pounds of an 8-6-6, 6-8-6, or 10-6-4 fertilizer. If the soil is capable of producing a lush growth of grass or sod the fertilizer application may be more confined nearer the area under the spread of the tree and to fertilizers with the higher nitrogen content."

Improved Cover Crop

In Better Crops of August-September 1936 E. H. Rawl of Clemson College, South Carolina, recommends the use of a complete N-P-K fertilizer in the peach orchard plus the use of dolomitic limestone. In the South Carolina peach tests not only foliage and tree growth but size of fruit was greatly improved by the use of complete fertilizer plus the limestone. Where such fertilization was given, it is interesting to note

Twenty-two-year-old Stayman in non-legume cover crop block. Non-legume covers have been rye when seeded in August and millets when seeded in early summer.

good stands of cowpea cover resulted even under the spread of peach tree branches.

The orchard soil fertility problem is not solved, however, with application of complete fertilizers or any one of the fertilizer elements. The fertility problem is interlaced with the general system of soil management of the orchard; i.e., cultivations given or not given, kinds of covers grown or not grown.

As reported in Pennsylvania State College Agricultural Experiment Station Bulletin number 294, "Twenty-five Years of Orchard Soil Fertility Experiments," the authors state:

"The fertility of an orchard soil is more than its plant-food content. It

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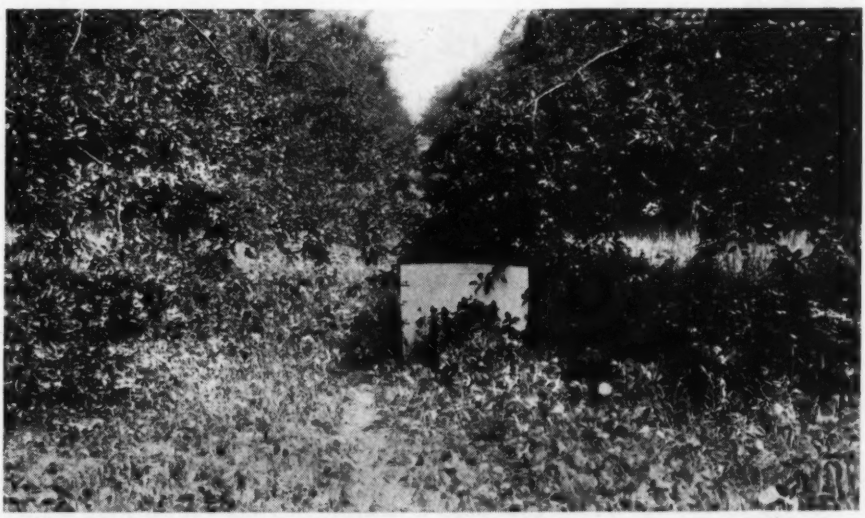

Twenty-two-year-old Stayman in legume cover crop block. Note branches meeting between the row. Legumes have been mixtures of clovers, including deep-rooted sweet clover, and soybeans each year.

It Takes Knowledge To Live With Soil

By E. B. Swingle

Michigan State College of Agriculture, East Lansing, Michigan

MICHIGAN'S 196,000 farmers have learned to live with soil and weather. They have learned, especially with potatoes, that efficient production and long-time farming mean tying down the soil with grass and legumes, and that profits are closely linked with commercial fertilizers supplemented where feasible with livestock.

One doesn't need to pile on adjectives about the State's use of fertilizers. Records for 1937 compiled by the soils department at Michigan State College indicate that 144,500 tons of fertilizers were purchased and applied on farms within the State. Typical of farming practices requiring wise use of fertilizer are the potato growers.

Take Alphonse Verschure, Manistique, for instance. He recently was crowned as the premier potato grower of the State for 1937. Cropping out of his production record are some of these facts:

On a 10-acre test plot entered for competition in the 300-bushel potato club in 1937, he produced an average

For growing 1,147 bushels of yellow globe onions to the acre, Carl McGuffey of Shelbyville is being crowned Michigan's new Onion King by another Michigan muck farmer, F. King Serviss, Owosso, past president of the Michigan Muck Farmers' Association.

A Michigan potato field after midsummer rains put soil and plant food and sunlight to work.

yield of 524 bushels to the acre of which 485 bushels were certified U. S. No. 1 grade. He applied 1,000 pounds of a 1-13-13 fertilizer to the acre, on May 28, planted 30 bushels of seed to the acre spaced 13 by 30 inches, and sprayed six times.

Right on his heels were Gaspardo Brothers, Franklin Mine, Michigan, growing 523 bushels to the acre, of which 440 were U. S. No. 1 grade. They used 950 pounds of 4-16-16 fertilizer to the acre, planted 25 bushels of seed to the acre spaced 14 by 36 inches, and sprayed five times.

Not all Michigan farms get similar fertilizer treatments. Visitors from Vermont were in Michigan last summer expressing amazement that in spite of the State's rating as a potato producer, the average field in July showed such little development.

"Must be a lack of fertilizer," they told E. J. ("Ernie") Wheeler, farm crops specialist of Michigan State College. Wheeler was showing them some of the best potato sections of the State and happened at the time to be on the farm of Reisner Brothers and Hopp, near Rogers City in Presque Isle County.

"Back in Vermont we get potatoes, and we get early and large growth of tops with a ton of fertilizer to the acre," the visitors bragged.

These eastern growers were surprised and almost inclined to scoff when they learned that the field they were looking at had an application of only 250 pounds of 2-16-8 fertilizer.

Unusual Conditions

Wheeler explains simply what makes Michigan agriculture in general and potato production in particular seem peculiar to farmers from other States. It's the combination of soil, climate, and cropping system. Fertilizer recommendations which were being followed on that farm near Rogers City were necessarily not high, because the farmers were practicing good business economy. They were putting on fertilizer at a profit and knew just when to stop.

Rains in July pushed that particular field along and put on good top growth for early maturity and harvest before chilling. The yield averaged 473 bushels to the acre on a 5½-acre field. Seventy-five per cent were U. S. No. 1 grade certified for sale as seed. As a contest entry the yield rated tenth place in the State for 1937.

"Extra fertilizer on the field would not have paid. What was applied was

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Were the Professors Wrong?

By F. H. Jeter

Agricultural Experiment Station, Raleigh, North Carolina

RED clay lands, so the professors explained rather patiently to me as a college student years ago, contain enough potash to make fairly good acre yields of most crops. It is only necessary, therefore, to use just the ordinary amounts of potash contained in the average fertilizer mixtures. In some instances it may not be necessary to use any potash at all. There is enough in the soil for all ordinary uses, they explained, and if the farmers only had gumption enough to rotate their lands with legumes, plow under a part of the legume crop every year, then all potash requirements for crops on these lands would be beautifully solved.

I rather think the professors believed what they taught. As a rule, they are an honest bunch of fellows. I have been associated with them nearly the whole time since I was graduated on that glorious June day and have found them so. Therefore, after they had armed me with such an important bit of wisdom, I did my best to pass it on to all farmers with whom I came in contact. For the first few years out of college, I did it rather dogmatically, because I had the facts. I suspect I was at times somewhat arrogant about it, because no one ever knows so much as the right recent college graduate. It takes a long time for him to accumulate any real knowledge.

Just a short while ago, however, I was on the farm of W. L. Smith of Lexington, route 6, in Davidson County, North Carolina. Mr. Smith is a good farmer, owns 331 acres of fertile land

John Arey (left), chief of the State College Extension Dairy Office, and A. R. Morrow (right), county agent of Iredell County, are seen here knee deep in some red clover grown with potash and phosphate on the red clay land of Iredell.

along the Yadkin River, and depends for his cash income on sales of lespedeza seed, wheat, and some hay, corn, and swine. Just this past year he sold $2,400 worth of lespedeza seed and some 600 bushels of wheat. His wheat heads up well, the stalks are strong, and the grain weighs heavily. His soil is, I think, composed of that Davidson clay which is known as good land.

Top-dressed With Potash

Since this is not a technical treatise but rather an explanatory story, I have not searched to find the potash content of his soil, but Mr. Smith told me that he top-dressed his wheat with muriate of potash in addition to fertilizing it at seeding time with a mixture containing potash. Keep in mind also that he grows lespedeza in quantity and probably plows under a good bit of stubble that should do the work of releasing all that potash about which the professors instructed me years ago.

Then, later I made a visit to Alexander County where the farmers also grow wheat and other small grain. They plant some tobacco, and while the farms are small, these men are all good farmers. During the day, County Agent J. P. Leagans and I visited five or six farms seeking information about the new hydraulic rams which are being installed throughout the county, but as we rode along from farm to farm and talked over things, Mr. Leagans explained that not only did the farmers use potash in the fertilizing mixtures applied when the grain was seeded, but they also used it in side applications.

Naturally, a high potash content would be used in the tobacco fertilizer, but despite the fact that these Alexander farmers grow legumes in their rotations, they also are finding that side applications of the material pay on their soils for both corn and cotton.

The same thing is true in Iredell County. Those acquainted with North Carolina agriculture will rate Iredell farmers as among the best in the State. The other afternoon, I drove up there with John A. Arey and A. C. Kimrey of our dairy extension office to see some of the good pastures which A. R. Morrow, the county agent, is having planted all over the county. We visited some fine demonstrations. The men seeding them are using ground limestone on the land, cutting it thoroughly with a disk harrow pulled by a tractor, and are then dragging the seed bed with the smoothing harrow. They plant 12 pounds of orchard grass, 6 pounds of herds grass, 6 pounds of blue grass, and 2 pounds of white dutch clover to the

A. C. Kimrey of N. C. State College shows the difference in alfalfa growth. The left hand measures alfalfa in check plot, the right shows growth on that part of the field fertilized at the third cutting last year with potash and phosphate. No "yellows" occur in the alfalfa in the background.

acre. This is seeded with a grain drill along with 200 pounds of 16 per cent superphosphate and 100 pounds of muriate of potash. Each winter the pasture is top-dressed with manure and the same fertilizer.

There were 275 farmers out to see two pastures on the farms of H. W. Wilson and his brother-in-law, L. B. Haas. Each of these men owns about 90 acres of land and secures his principal income from selling milk and cream to a local ice cream plant. They have plenty of manure to spread about over their cultivated acres, and so they make from 1 to 2 bales of cotton an acre. But both expressed the thought that 1 acre of the pasture was worth 2 acres of any other land on the farm, and there was less work connected with the pasture. The cows are allowed to graze for 1 hour in the morning and for 1½ hours each afternoon.

Additional Pasture

Mr. Haas said the animals get all the grazing they want during that period of time and are soon lying down contentedly chewing their cuds. He grazed 18 cows from March until November on the 5 acres in his pasture, using some supplementary grazing crops as needed in the late summer. Mr. Wilson has 8 acres in his pasture, and he grazed 15 cows on this for the 2½ hours a day all of last summer. Both men are now planting additional pasture fertilized in the same way.

Mr. Morrow said that G. S. Smith, route 2, Cleveland, found his cotton yield declining to where he made only 3 bales on 6 acres of land. Last year he added 100 pounds per acre of muriate to his regular fertilizer and produced 6 bales on 5 acres. Mr. Smith is another of those good Iredell farmers who plant lespedeza and clover, but who have found that perhaps the professors were wrong.

"Where we grow lespedeza and clover in this county, we must have additional potash," Ray Morrow said. I am not a scientist, but it seems to me that these legumes feed upon the available phosphate and potash in the soil and if the two elements are not replaced by extra applications, the plant food in the soil gets out of balance with consequent loss of production rather than gain.

Results Tell a Story

To prove this, Mr. Morrow took me over to the county home where he has a fine 7-acre field of alfalfa. The crop has been on the ground for 7 years, and last year at the third cutting, Mr. Morrow fertilized or top-dressed the field with 200 pounds of superphosphate and 200 pounds of muriate of potash per acre. In a little section just at the roadside, he used none. This section was afflicted with yellows or "summer disease" on April 29 before real summer had ever begun, and the alfalfa growing there looked as if it would be a long time in producing enough growth to cut. On the remainder of the field where the potash-phosphate treatment had been applied, the crop was about ready to cut and had a fine, vigorous, deep-green growth that would yield handsome returns in hay.

"But, Ray," I said, "why not use some boron on this. Down in the Sandhills they are using about 15 cents worth of boron per acre, and it is seemingly overcoming the yellows disease."

"We have tried it, but it doesn't work here," Morrow replied. "This soil seems to need the potash and the potash gives the desired results."

Across the road were 23 acres of the finest Red Hart wheat that I have ever seen. Seeded on it are lespedeza and some of the other clovers. These will be allowed to grow and take the land when the wheat has been cut, and then next year the field will go to corn. It was in corn last year and produced 49 weighed bushels to the acre. The wheat had followed the corn and was seeded at the rate of 1 bushel of seed per acre. Three hundred pounds per

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PICTORIAL

"BACK" IN THE "GOOD OLD DAYS."

PROMISES

HOLIDAYS

Fences in Midsummer.

The Editors Talk

For the Sake of the Cause

A great many people are wondering how we can make our national agriculture more successful than it is. All sorts of cures are proposed. Curtailing acreage, with the hope of maintaining a higher price level, helping the farmer put land into soil-building crops, payments to the farmer of various kinds, all have a place in the national program.

But in addition to all this, for ages men have done things and have met their mutual problems by assembling together to help the cause. And when that cause is a better agriculture and service on the part of public officials and industry, the assembling is well worth the trouble and the cost.

A number of important meetings either have been or will be held in June. Among them was the Annual Convention of the National Fertilizer Association at White Sulphur Springs, West Virginia, on June 6; a meeting of the fertilizer trade with the staff of the Pennsylvania State College June 14 and 15; and later this month a tour in Indiana of the Plant Food Research Committee to examine fertilizer plots. In Ottawa towards the end of the month there will be an important joint meeting of the American Association for the Advancement of Science, the Northeast Section of the American Society of Agronomy, and the Canadian Society of Technical Agriculturists. These meetings have special features in which the groups meeting together are particularly interested, but underlying all of them is the common purpose of learning how to meet the problems of our national agriculture.

At the Convention of the National Fertilizer Association, a substantial budget was approved for soil improvement work including many educational projects which will enable the fertilizer industry to better serve the farmer in supplying him with the fertilizers that give him maximum returns. As pointed out by one of the speakers, industries serving the farmer are becoming more and more service organizations and not merely selling agencies. The fact that if agricultural industries are to be successful the farmer must first conduct his farming operations in a successful manner is becoming more and more appreciated. If he does not make a success of his spraying or the use of his fertilizers or other farm activities, then the industries supplying those needs become more and more conscious that they have an important relation to that farmer in helping him solve the problem.

At State College, Pennsylvania, the agricultural staff of the college met many members of the fertilizer trade. A number of subjects of mutual interest to agricultural workers and the trade were discussed. The views of college officials on fertilizer problems in relation to producing apples and other horticultural crops and the requirement of a general farming rotation, truck crops, and other problems were fully discussed. At State College is located the oldest continuous fertilizer experiments in the United States. This test has been running more than 50 years.

On a very interesting tour of the experiment station these plots, as well as experimental work on vegetable crops, golf lawns and fairway grasses, fertilizer experiments on orchards, potatoes, pastures, and other crops were inspected by the visitors.

Such meetings and tours are among the best means possible for bringing before members of the industry the fertilizer problems of the farmer and how the State is trying to solve them. Nothing but good can come out of such a mutual attack on our everyday problems of crop production. States holding such meetings and giving the time to industries serving the farmer are to be congratulated on their enterprize and efforts in this direction.

The Plant Food Research Committee represents the entire fertilizer industry. The function of the Committee is to study fertilizer problems. Because of unusual interest in many States in fertilizer placement in the soil, heavy applications of fertilizers have been made broadcast on a number of soil types. The purpose of the June tour in Indiana is to study the effect of such applications on crop production and on the amounts of available plant nutrients in the soil.

The Joint Meeting in Ottawa of the American Association for the Advancement of Science and affiliated groups with the Canadian Society of Technical Agriculturists and other Canadian organizations adds an international aspect to the conferences held in June. Members of these important national and international societies will thus have an excellent opportunity to confer personally with agricultural workers across the line. Many of the problems in connection with the production of potatoes, pastures, fruit, tobacco, and other crops are interrelated and common to both countries. No doubt, as a result of this meeting, there will be a better understanding of such problems and the work that is being done to solve them.

As long as men interested in agriculture get out individually and in groups to do something themselves about a more successful agriculture, there is every reason to believe that in the long run our national agriculture will remain a virile and successful enterprise.

Their Work Will Live

Coming as a shock to their wide circles of friends and acquaintances, the deaths of two of America's outstanding agriculturists occurred the latter part of May. Dr. George F. Warren, professor of agricultural economics and farm management at Cornell University, passed away on May 24, while May 31 marks the passing of Herbert W. Mumford, dean of the college of agriculture at the University of Illinois.

Both were farm-reared in an era which frowned upon any scientific approach to farm problems. Both early recognized the power of the mind and the value of research work and cooperative action. Years of preparation equipped them for consideration as authorities in their respective fields.

For those not more particularly informed, press eulogies have outlined the contributions of these men to the betterment of our national agriculture. Sincere in interest and effort, over a long span of years, they won respect not only for their common-sense attack on current problems but for their foresightedness on the agricultural future of this and other countries. As our destinies are determined, there will be many references to their teachings. The names of George F. Warren and Herbert W. Mumford will live on.

REVIEWS

This section contains a short review of some of the most practical and important bulletins, and lists all recent publications of the United States Department of Agriculture and the State Experiment Stations relating to Fertilizers, Soils, Crops, and Economics. A file of this department of BETTER CROPS WITH PLANT FOOD would provide a complete index covering all publications from these sources on the particular subjects named.

Fertilizers

¶ Although the various parasitic diseases doubtless take the heaviest toll from the annual production of cabbage and other plants of the Cruciferae family, soil-mineral deficiencies are among the chief nonparasitic maladies which result in considerable damage in production. Much valuable information concerning the control of cabbage diseases influenced by the soil and climate as well as the common parasites is contained in U. S. Department of Agriculture Farmers' Bulletin 1439, entitled "Diseases of Cabbage and Related Plants," by J. C. Walker. This publication is a revision of and supersedes Farmers' Bulletins 925 and 1351.

Cabbage is a heavy user of potash, and when the soil supply of this nutrient falls below a certain level, disease symptoms appear. Characteristic symptoms of this condition are revealed by the yellowing of the foliage between the veins and particularly around the outer leaf margins. At this point the tissue ultimately disintegrates, and saprophytic fungi develop. Plants so afflicted produce heads that remain soft indefinitely, thus resulting in an unmarketable crop. To safeguard against this condition, the author recommends that the soil be tested before planting. There should be from 250 to 400 pounds of available potash per acre for a normal crop of cabbage.

A low level of available magnesium in many of the soils in the eastern United States results in characteristic disease symptoms on cruciferous crops. Yellowish areas later becoming light-colored desiccated spots between leaf veins indicate lack of sufficient magnesium. This deficiency can ordinarily be corrected by using fertilizers made slightly basic with dolomitic limestone and containing soluble magnesium salts.

Internal spot of rutabaga, turnip, and cauliflower is a common trouble due to boron deficiency in the soil. This nutritional disorder can usually be prevented by applying about 20 pounds of borax to the acre.

The parasitic diseases are preventable in the main by simple means of plant sanitation and planting resistant varieties, the author emphasizes. Rotation of crops should be practiced and crops belonging to the cabbage family, such as cauliflower, turnip, brussels sprouts, and kale should be avoided in the rotation. Drainage water, refuse from diseased cabbage fields, and stable manure with which diseased material has been mingled will carry infection. The greatest pains should be taken to insure healthy plants grown in the seedbed. Specific precautionary measures and ways of controlling clubroot, root knot, blackleg, and other common diseases too numerous to list are thoroughly explained in this bulletin.

"Fertilizer Experiments with Cotton—1937," Agr. Exp. Sta., Fayetteville, Ark.

"Phosphate Investigations on Irrigated Crops, 1937," Agr. Exp. Sta., Bozeman, Mont., Bul. 356, Mar. 1938, Jesse R. Green.

"Report on Sugar Beet Field Demonstrations in Wisconsin—1937," Agr. Exp. Sta., Madison, Wis., Mar. 1938, A. O. Collantine, O. S. Aamodt, and C. J. Chapman.

Soils

¶ Several noteworthy bulletins giving the latest and most complete instructions on terracing have been issued by State and Federal authorities in recent months. A list of these has appeared under this department from time to time, and to this are added two new publications that should be of much value to farmers, county agents, and vocational agriculture teachers who seek practical information on terracing to conserve soil and water on sloping terrains.

The North Carolina Agricultural Extension service has just released Circular 222, "Terracing to Reduce Erosion," by David S. Weaver and H. M. Ellis. The authors devote considerable attention to the essential points of proper spacing, grade, cross section, and maintenance of the broad-base, drainage type terraces. This type of terrace has been found by experience to be most suitable in North Carolina and other States. Terracing is only one phase of a well-rounded soil conservation practice, and alone will not solve the problem of soil erosion. But terracing on slopes and on soil types where it is practical forms a basis upon which a more complete soil conservation program may be developed.

¶ Covering a somewhat wider field but including the essential principles of improved terrace construction is C. L. Hamilton's U. S. Department of Agriculture Farmers' Bulletin 1789 on "Terracing for Soil and Water Conservation." In this interesting bulletin the author traces the use of field terraces in this country from colonial days to the present time. He explains why early efforts at terracing generally failed and describes new developments now incorporated in terrace construction, widely used in all parts of the country. Stressing the need for careful planning and a thorough understanding of the needs and adaptabilities of fields to be terraced, the author states that "unless properly constructed and coordinated with other practices, terraces often accelerate rather than retard soil loss."

These bulletins are a compilation of the best information obtainable on terrace construction and should afford a better understanding of its role in a complete soil conservation program. Each is written in very readable style, and is freely illustrated.

"The Reclamation of Alkali Soils," Agr. Exp. Sta., Berkeley, Calif., Bul. 617, Dec. 1937, W. P. Kelley.

"Soils of Fergus County, Montana," Agr. Exp. Sta., Bozeman, Mont., Bul. 355, Feb. 1938, L. F. Gieseker.

"Implements and Methods of Tillage to Control Soil Blowing on the Northern Great Plains," U. S. D. A., Washington, D. C., Farmers Bul. 1797, Jan. 1938, John S. Cole and George W. Morgan.

"Spreading Water for Storage Underground," U. S. D. A., Washington, D. C., Tech. Bul. 578, Dec. 1937, A. T. Mitchelson and Dean C. Muckel.

"The Chemical Composition of Soils and Colloids of the Norfolk and Related Soil Series," U. S. D. A., Washington, D. C., Tech. Bul. 594, Jan. 1938, R. S. Holmes, W. E. Hearn, and H. G. Byers.

Crops

¶ John S. Gardner in Kentucky Agricultural Extension Circular 308, "Sweet Potato Growing," gives the major points involved in producing Kentucky's fifth value-ranking crop. This comprehensive publication explains pertinent facts relating to the different varieties and their characteristics, plant or "slip" production, seed treatment, handling the plant beds, preparing the soil, fertilization, cultivation, and harvesting the crop. The latter section of the circular gives specific instruction for controlling diseases and pests, and also ways and means for curing and storing.

The light sandy loams, commonly known as the "freestone" soils, are best adapted to sweet potatoes, since they offer least resistance to the formation of shapely tubers. A soil that produces about 25 bushels of corn should be ideal. A 2-8-8 or 2-10-8 fertilizer is recommended for sweet potatoes. The suggested rate of application is 500 pounds per acre, although good results may be expected when 300 pounds are used. The soil and fertilizer should contain only moderate amounts of nitrogen,

since an excess of nitrogen and humus produces long, twisted "strings" instead of the short, plump tubers the market demands.

The Nancy Hall variety, according to the author, is most widely grown in the State. Its golden flesh and bright skin color have made it a favorite in the markets in which Kentucky sweet potatoes move. Its top growth is not too luxuriant and the tubers are of acceptable size and uniformity when properly fertilized and certified seed is planted. The Puerto Rico strains, Big-Stem Jersey, and Red and White Bermuda, are likewise popular varieties.

"The Home Garden," Agr. Ext. Serv., Auburn, Ala., Cir. 134, June 1932 (Rev. 1938), W. A. Ruffin.

"The Alabama Home Orchard," Agr. Ext. Serv., Auburn, Ala., Cir. 138, June 1933 (Rev. 1938), W. A. Ruffin.

"Forage Crops for Hogs," Agr. Ext. Serv., Auburn, Ala., Cir. 158, June 1937, J. C. Lowery and F. W. Burns.

"Cotton Improvement in Alabama," Agr. Ext. Serv., Auburn, Ala., Cir. 159, June 1937, J. C. Lowery.

"Kudzu," Agr. Ext. Serv., Auburn, Ala., Cir. 161, Feb. 1938, J. C. Lowery.

"Arizona's Changing Agriculture—Forty-eighth Annual Report for the Year Ending June 30, 1937," Agr. Exp. Sta., Tucson, Ariz.

"Apricot Growing in California," Agr. Ext. Serv., Berkeley, Calif., Cir. 51, Dec. 1930 (Rev. Dec. 1937), A. H. Hendrickson.

"Ladino Clover," Agr. Ext. Serv., Berkeley, Calif., Cir. 81, Dec. 1933 (Rev. Dec. 1937), B. A. Madson and J. Earl Coke.

"Asparagus," Agr. Ext. Serv., Storrs, Conn., Bul. 260, Jan. 1938, Albert E. Wilkinson.

"Annual Report for the Fiscal Year Ending June 30, 1937," Agr. Exp. Sta., Gainesville, Fla.

"4-H Garden Club Manual," Agr. Ext. Serv., Lafayette, Ind., Ext. Bul. 227, May 1938, W. B. Ward and W. R. Amick.

"Report on Agricultural Research for the Year Ending June 30, 1937. Part I, Project Reports, Publications, Staff, and Financial Statement," Agr. Exp. Sta., Ames, Iowa, R. E. Buchanan, Director.

"Lawn Building, Maintenance, and Renovation," Agr. Ext. Serv., Ames, Iowa, Cir. 242, Sept. 1937, J. B. Wingert.

"The Vegetable Garden," Agr. Ext. Serv., Ames, Iowa, Ext. Cir. 245, Dec. 1937, E. S. Haber.

"The Vegetable Garden," Agr. Ext. Serv., Lexington, Ky., Cir. 309, Feb. 1938, John S. Gardner.

"Grapes for the Home," Agr. Ext. Serv., Lexington, Ky., Cir. 209 (Rev.), Feb. 1938, A. J. Olney.

"Potato Growing," Agr. Ext. Serv., Lexington, Ky., Cir. 307, Jan. 1938, John S. Gardner.

"Cold Resistance Studies with Satsuma Orange Trees," Agr. Exp. Sta., University, La., Bul. 295, Jan. 1938, W. D. Kimbrough.

"Louisiana Program for Strawberry Production," Agr. Ext. Serv., University, La., Ext. Cir. 152, 1933 (Rev. June 1937), George L. Tiebout and J. G. Richard.

"Fattening Steers of Different Ages on Pasture, with and without Grain, and Influence of Method on Quality of Meat," Agr. Exp. Sta., University, La., Bul. 296, Apr. 1938, Chas. I. Bray.

"Sweet Potato Culture, Storing and Curing in Louisiana," Agr. Ext. Serv., University, La., Hort. Hints, Vol. 1, No. 2, 1933 (Rev. June 1937), G. L. Tiebout and J. G. Richard.

"Bush Beans as a Truck Crop for South Louisiana," Agr. Ext. Serv., University, La., Hort. Hints, Vol. 1, No. 4, 1933 (Rev. June 1937), George L. Tiebout and J. G. Richard.

"Cucumbers as a Truck Crop for South Louisiana," Agr. Ext. Serv., University, La., Hort. Hints, Vol. 1, No. 5, 1933 (Rev. June 1937), George L. Tiebout and J. G. Richard.

"Bell Peppers as a Truck Crop for South Louisiana," Agr. Ext. Serv., University, La., Hort. Hints, Vol. 1, No. 6, 1933 (Rev. June 1937), George L. Tiebout and J. G. Richard.

"Shallots as a Crop for South Louisiana," Agr. Ext. Serv., University, La., Hort. Hints, Vol. 1, No. 7, 1933 (Rev. June 1937), George L. Tiebout and J. G. Richard.

"Root Crops as Truck Crops for Louisiana," Agr. Ext. Serv., University, La., Hort. Hints, Vol. 1, No. 8, 1936 (Rev. June 1937), George L. Tiebout and J. G. Richard.

"The Small Vegetable Garden," Agr. Ext. Serv., College Park, Md., Bul. 70 (Rev.), Dec. 1937, W. R. Ballard.

"The Massachusetts Commercial Vegetable Grower," Agr. Ext. Serv., Amherst, Mass., May 1938.

"Tomato Varieties," Agr. Exp. Sta., East Lansing, Mich., Sp. Bul. 290, Apr. 1938, Gordon Morrison.

"The First Twenty-five Years of the Northeast Experiment Station," Agr. Exp. Sta., Duluth, Minn., Apr. 1938, M. J. Thompson.

"Leader's Guide—Farm Forestry. II—Forest Seeding and Planting," Agr. Ext. Serv., Columbia, Mo., Dec. 1937.

"Farm Forestry. II—Forest Seeding and Planting," Agr. Ext. Serv., Columbia, Mo., 4-H Cir. 52, Dec. 1937, Ralph H. Peck and T. T. Martin.

"Oats and Barley on New York Farms," Agr. Ext. Serv., Cornell Univ., Ithaca, N. Y., Bul. 376, Sept. 1937, F. P. Bussell.

"Why and How to Treat Cotton Seed," Agr. Ext. Serv., Raleigh, N. C., Ext. Folder 39, Apr. 1938, Luther Shaw.

"Use of Organic Acid in Rooting Cuttings," Agr. Ext. Serv., Raleigh, N. C., Ext. Cir. 221, Apr. 1938, J. G. Weaver.

"The Culture of Flue-cured Tobacco in North Carolina," St. Dept. of Agr., Raleigh, N. C., Bul., Jan. 1938, W. Kerr Scott, Comm.

"Limited-grain Feeding and All-year Pasture for Dairy Cows," Agr. Exp. Sta., Knoxville, Tenn., Bul. 163, Jan. 1938, C. E. Wylie and L. R. Neel.

"Abstracts of Bulletins 539-557, Circulars 79-80, and Other Publications During 1937," Agr. Exp. Sta., College Station, Brazos County, Texas, Cir. 81, Apr. 1938, A. D. Jackson.

"Forty-seventh Annual Report for the Fiscal Year Ended June 30, 1937," Agr. Exp. Sta., Pullman, Wash., Bul. 354, Dec. 1937.

"The Washington and Tahoma Red Raspberries," Agr. Exp. Sta., Pullman, Wash., Pop. Bul. 153, Mar. 1938, C. D. Schwartze.

"Growing Fruit for Home Use," U. S. D. A., Washington, D. C., Farmers' Bul. 1001, Rev. Feb. 1938, H. P. Gould.

"Muscadine Grapes," U. S. D. A., Washington, D. C., Farmers' Bul. 1785, Jan. 1938, Charles Dearing.

.."Farm Production of Sorgo Sirup," U. S. D. A., Washington, D. C., Farmers' Bul. 1791, Mar. 1938, C. F. Walton, Jr., E. K. Ventre, and S. Byall.

"Relation of Growth to the Varying Carbohydrate Content in Mountain Brome," U. S. D. A., Washington, D. C., Tech. Bul. 598, Jan. 1938, Edward C. McCarty.

"Rubber Content and Habits of a Second Desert Milkweed (Asclepias Erosa) of Southern California and Arizona," U. S. D. A., Washington, D. C., Tech. Bul. 604, Feb. 1938, R. E. Beckett, R. S. Stitt, and E. N. Duncan.

"When to Cut Rice," U. S. D. A., Washington, D. C., Leaflet 148, Dec. 1937, W. D. Smith and Jenkin W. Jones.

"Production of Parsnips," U. S. D. A., Washington, D. C., Leaflet 154, Feb. 1938, J. H. Beattie and W. R. Beattie.

"Production of Salsify or Vegetable-Oyster," U. S. D. A., Washington, D. C., Leaflet 135, Feb. 1938, W. R. Beattie.

Economics

¶ According to Charles S. Chathcart, State Chemist at New Brunswick, New Jersey, in his report "Analyses of Commercial Fertilizers and Ground Bone; Analyses of Agricultural Lime, 1937," Bulletin 640, the average composition of fertilizers sold in New Jersey was 4.39% nitrogen, 9.56% available phosphoric acid, and 7.63% potash. In 1928 the average analysis was 3.27% nitrogen, 8.78% available phosphoric acid, and 6.36% potash, with a total plant-food content of 18.41% as compared to the total plant-food content of 21.58% in 1937. Although the farmer is getting more plant food per ton, he is paying considerably less for his fertilizers. In 1928 for approximately 18½ units of plant food he paid $37.03, whereas in 1937 he paid only $29.44 for 21½ units.

Fertilizer sales in the State have shown considerable increase since 1927, when 141,635 tons were sold, as compared to the total sales of 183,952 tons in 1937. Figures for total tonnages of mixed fertilizers and fertilizer materials are secured from two reports from manufacturers which are required each year. One is rendered in April and the other in November. Unfortunately, however, the tonnages of the individual brands are not given. Thus, the average analysis must be computed from the State Chemist's samples. In 1937, 163,093 tons of mixed fertilizers were sold, and based on the average analysis as reported in the Bulletin, this would represent 7,160 tons of nitrogen, 15,592 tons of P_2O_5, 12,444 tons of K_2O, or a total of 35,196 tons of plant food.

¶ In Bulletin 393, "Registration, Labeling and Inspection of Commercial Fertilizers; 1937" published by the College of Agriculture of the University of Missouri, is shown a comprehensive summary of the various fertilizer mixtures and materials sold in the State in 1937. The leading analysis from the tonnage standpoint was 2-12-2, which was followed by 0-20-0, 0-16-0, 2-12-6, and 4-12-4. Missouri is still one of the newer States from the fertilizer standpoint, with 1937 sales of only 61,357 tons of fertilizers, containing approximately 1,015 tons of nitrogen, 8,567 tons of available phosphoric acid, and 1,338 tons of potash. The Experiment Station has recommended a list of high-grade analyses which they feel should give the best results under most conditions, and carry plant food in a most economic form. Although sales of these recommended brands are increasing, a large quantity of fertilizers

which contain less than 20 units of plant food is still sold. In 1937, 8,287 tons were high-grade mixed fertilizer, 28,254 tons were medium-grade, and only 7 tons were so-called low-grade mixtures.

"Illinois Farm Economics," Agr. Ext. Serv., Urbana, Ill., Nos. 34 and 35, Mar. and Apr. 1938.

"Indiana Crops and Live Stock," Agr. Exp. Sta., West Lafayette, Ind., No. 147, Dec. 1937, No. 148, Jan. 1938, No. 150, Mar. 1, 1938, No. 151, Apr. 1, 1938, and No. 152, May 1, 1938.

"Crop Report for Michigan, May 1938," St. Dept. of Agr., Lansing, Mich., Verne H. Church, Grant D. Clark, and Manfred L. Lowe.

"Farm Planning," Agr. Ext. Serv. Univ. Farm, St. Paul, Minn., Pamphlets No. 43, 44, 45, 46, 47, 48, 49, and 50, Jan. 1938, S. B. Cleland and W. A. Peters.

"The Dairy Farmer's Response to Changes in Natural and Economic Conditions," Agr. Ext. Serv., Univ. Farm, St. Paul, Minn., No. 185, May 20, 1938, G. A. Pond and W. P. Ranney.

"Effects of Better Selection of Crops and Pastures on Farm Income in Missouri," Agr. Exp. Sta., Columbia, Mo., Res. Bul. 282, Apr. 1938, George W. Collier and O. R. Johnson.

"Analyses of Commercial Fertilizers, Fertilizer Supplies, and Home Mixtures for 1937," Agr. Exp. Sta., New Brunswick, N. J., Bul. 637, Nov. 1937, Charles S. Cathcart.

"A Picture of the Asparagus Industry for New Jersey Farmers," Agr. Exp. Sta., New Brunswick, N. J., Bul. 641, Feb. 1938, K. R. Slamp and L. A. Bevan.

"Report of Analyses of Commercial Fertilizers Sold in New York State, July 1, 1936 to June 30, 1937," Dept. of Agr. and Mkts., Albany, N. Y., Bul. 315, Mar. 1938.

"Current Farm Economics," Agr. Exp. Sta., Stillwater, Okla., Series 49, Vol. 11, No. 2, Apr. 1938.

"Inspection of Feeds and Fertilizers," Agr. Exp. Sta., Kingston, R. I., An. Feed and Fert. Cir., Contb. 513, Nov. 1937, W. L. Adams, T. Wright, Jr., and Louis Linton.

"Department of Agriculture—Immigration of Virginia," Richmond, Va., Rept. of the Comm., 1936-1937.

"Historical and Geographic Aspects of Wheat Yields in Washington," Agr. Exp. Sta., Pullman, Wash., Bul. 355, Dec. 1937, Ben H. Pubols and Carl P. Heisig.

"Fertilizers Licensed for Sale in Wisconsin," Wis. Dept. of Agr., Feb. 1, 1938.

"A Graphic Summary of Farm Crops," U. S. D. A., Washington, D. C., Misc. Pub. 267, Mar. 1938, O. E. Baker and A. B. Genung.

"Balanced Farming—1938," U. S. D. A., Washington, D. C., Reg. Inf. Series, ECR 202, Delaware, Kentucky, Maryland, North Carolina, Virginia, and West Virginia.

"Summary of the 1938 A. A. A. Farm Program, Northeast Region," U. S. D. A., Washington, D. C., Reg. Inf. Series, NER 213, Rev. Apr. 8, 1938.

"The 1938 Farm Program for Nebraska and South Dakota," U. S. D. A., Washington, D. C., Reg. Inf. Series, NCR 202.

"How the A. A. A. Farm Program will Operate in 1938," U. S. D. A., Washington, D. C., Reg. Inf. Series, SR 201, Mar. 1938 and SR 202, Apr. 1938.

"Improvement and Conservation of Oklahoma and Texas Range Lands," U. S. D. A., Washington, D. C., Reg. Inf. Series, SR 251, Apr. 1938.

"Information on Proposed Potato Marketing Agreement Program for the State of La. and Certain Designated Counties in the States of Ala., Ark., Calif., Fla., Ga., Md., Miss., N. C., Okla., S. C., Texas, and Va.," U. S. D. A., Washington, D. C.

"Marketing Agreement Regulating the Shipment in Interstate and Foreign Commerce, and Such Shipment as Directly Burdens, Obstructs, or Affects Interstate or Foreign Commerce of Cantaloupes, Honeyball and Honeydew Melons Grown in Imperial County, Calif. and Yuma County, Ariz.," U. S. D. A., Washington, D. C., Agreement No. 75, May 17, 1938.

"Order of the Secy. of Agr. Issued Pursuant to Public Act No. 10, 73rd Congress, as Amended and as Reenacted and Amended by the Agr. Marketing Agreement Act of 1937, Regulating Such Handling of Milk in the Cincinnati, Ohio, Marketing Area as Is in Interstate Commerce, and as Directly Burdens, Obstructs or Affects Interstate Commerce," U. S. D. A., Washington, D. C., Order 22, Apr. 27, 1938.

"Order of the Secy. of Agr., Issued Pursuant to Public Act No. 10, 73rd Congress, as Amended and as Reenacted and Amended by the Agr. Marketing Agreement Act of 1937, Regulating the Handling in Interstate Commerce, and Such Handling as Directly Burdens, Obstructs, or Affects Interstate Commerce, of Irish Potatoes Grown in the State of La.; and in the Counties of Atascosa, Bexar, Colorado, Fort Bend, Harris, Liberty, Medina, Wharton and Wilson in the State of Texas; the Counties of Warren, Hinds, Rankin, Scott, Newton and Lauderdale, and all Counties South Thereof, in the State of Miss.; the Counties of Baldwin, Escambia and Mobile in the State of Ala.; and the Counties of Escambia and Santa Rosa in the State of Fla.," U. S. D. A., Washington, D. C., Order 23, May 9, 1938.

"Order of the Secy. of Agr. Issued Pursuant to Public No. 10, 73 Congress, as Amended, and as Reenacted and Amended by the Agr. Marketing Agreement Act of 1937, Approved June 3, 1937 (Public No. 137, 75th Congress), Regulating the Handling in Interstate and Foreign Commerce and Such Handling as

Directly Burdens, Obstructs, or Affects Interstate or Foreign Commerce of Cantaloupes, Honeyball and Honeydew Melons Grown in Imperial County, Calif., and Yuma County, Ariz., U. S. D. A., Washington, D. C., Order 24, May 17, 1938.

"Recent Changes in the Florida Citrus Industry," U. S. D. A., Washington, D. C., GCM-5, 1938.

"Quality of Cotton Ginned in the Irrigated Southwest, Crops of 1928-36," U. S. D. A., Washington, D. C., W. B. Lanham, F. H. Harper, and G. E. Miller.

"Revised Production Estimates of Fruit and Nut Crops," U. S. D. A., Washington, D. C., Mar. 1938.

"Marketing Agreements for Fruits and Vegetables," U. S. D. A., AAA, Washington, D. C., GCM-3, 1938.

"United States Agricultural Trade with Canada 1937," U. S. D. A., Washington, D. C., F. S.-74, Mar. 1938.

"Revised Production of Apples, Peaches, Pears, Grapes, and Cherries, 1919-1935," U. S. D. A., Washington, D. C., June 28, 1937.

"Revised Production of Almonds, Filberts, Pecans, and Walnuts (English), 1919-1936," U. S. D. A., Washington, D. C., July 20, 1937.

"Grade, Staple Length, and Tenderability of Cotton in the United States 1928-29 to 1936-37," U. S. D. A., Washington, D. C., July 1937, W. B. Lanham.

"Soil and Water Conservation and Plant-Soil Relationships in the Southwest," U. S. D. A., Washington, D. C., Reg. Bul. 20, Soil Series No. 1, Nov. 11, 1937, Evan L. Flory.

"Printed Publications Issued by the Bureau of Agricultural Economics," U. S. D. A., Washington, D. C., Feb. 1938.

"The 1938 Range Conservation Program—Western Region," U. S. D. A., AAA, Washington, D. C., Reg. Inf. Ser., WR Leaf. 202, 1938.

"Determination of Fair and Reasonable Prices for the 1938 Crop of Puerto Rican Sugarcane Pursuant to the Sugar Act of 1937," U. S. D. A., AAA, Washington, D. C., S. D. No. 18, Mar. 9, 1938, H. A. Wallace.

"Corn Loans, Acreage Allotments and Marketing Quotas," U. S. D. A., AAA, Washington, D. C., 38-Corn-1, Mar. 1938.

"The 1938 Farm Program for Indiana, Illinois, Iowa, Missouri, Michigan, Minnesota, Ohio, and Wisconsin," U. S. D. A., AAA, Washington, D. C., Reg. Inf. Ser., NCR Leaf. 201.

"Balanced Farming for Tennessee—1938," U. S. D. A., AAA, Washington, D. C., Ref. Inf. Ser., ECR 202—Tenn.

Plenty of Citrus Fruits Assured for a Few Years

PLENTY of citrus fruit juice is in store for consumers during the next few years.

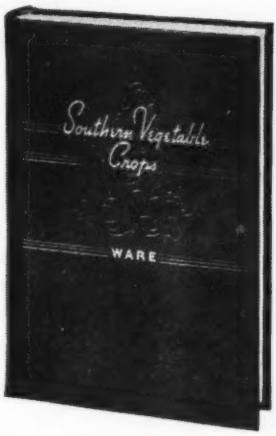
The large number of young trees just coming into bearing assure an abundant supply of oranges, lemons, and grapefruit.

In its annual Outlook Report, the Bureau of Agricultural Economics points out, for example, that a big portion of the orange-tree population is still very young. Of the 34,600,000 orange trees of bearing age (5 years old and over) estimated in the groves of California, Florida, Texas, and Arizona in 1937, 45 percent had not reached full production and 26 percent were in the relatively young group of 5 to 10 years of age. With almost one-half of the bearing trees to come into full bearing, average production during the next 5 years is expected to be larger than that of the past 5 years.

Only about one-third of the grapefruit-bearing trees had reached the age of full production in 1937. And only about two-thirds of the bearing acreage of lemons in California had reached full producing capacity.

The Bureau points out that the production of citrus fruits has shown a big increase in recent years. From 1919 to 1936 orange production increased about 80 percent; the production of apples, on the other hand, declined about 12 percent during this period.

Southern Vegetable Crops



WITH improved transportation facilities and changing food habits, the production of vegetable crops in the South for local markets and shipment to the North has enjoyed a truly remarkable growth. This has created a very healthy situation; healthy to the Northern consumers who are now able to get fresh vegetables during the winter months and healthy to Southern agriculture in promoting greater diversification.

Owing to its comparatively rapid growth there has been comparatively little collected information on this important branch of agricultural industry in the South. Those interested therefore will welcome the recently published book, "Southern Vegetable Crops," by George Whitaker Ware of the University of Arkansas (American Book Company, Cincinnati, $4.00). The author, who is in charge of the Fruit and Truck Branch Experiment Station of the University of Arkansas, is well qualified to write on the subject, and in order to bring in even wider experience he solicited a number of eminent authorities in all parts of the country for chapters on their specialties. In addition to sections written by the author himself, other chapters have been written by J. E. Knott, New York; J. B. Edmond, South Carolina; H. A. Jones, California; P. Work, New York; E. M. Emmert, Kentucky; H. C. Thompson, New York; J. G. Woodroof, Georgia; L. R. Hawthorn, Texas; J. J. Taubenhaus, Texas; S. W. Bilsing, Texas; W. D. Kimbrough, Louisiana; W. A. Sherman, U. S. Dept. of Agriculture; R. A. McGinty, South Carolina; B. D. Drain, Tennessee; J. C. Miller, Louisiana; F. S. Jamison, Florida; R. Schmidt, North Carolina; H. H. Zimmerley, Virginia; H. P. Stuckey, Georgia; G. O. Randall, North Carolina; E. H. Rawl, South Carolina; H. L. Cochran, Georgia; E. F. Burk, Oklahoma; Otis Woodard, Georgia; L. C. Corbett, U. S. Dept. of Agriculture; and C. Woolsey, Arkansas.

The first part of the book is devoted to giving the general principles which are necessary or desirable to know in efficiently producing vegetable crops. Chapters are devoted to the general statistical background of the vegetable industry; the botanical classification of vegetables; the botany and physiology of plant growth and development; the principles of vegetable feeding and improvement; seed growing; the management and fertilization of soils; growing, hardening, and transplanting of plants; planting, cultivating, rotating, irrigating, and forcing of the field; the control of diseases and insects; and vegetable storage and marketing.

Covers Wide Range

The second part contains chapters devoted to the growing of the individual crops. The material in this section is very concise, complete, and practical. The systematic arrangement of the subject matter in the various chapters

is greatly to be commended and enables one quickly and easily to locate the information, thereby increasing the value of the book as a text and reference. In practically all cases the chapters on individual crops are divided into the following sub-heads; Classification, origin, and history; scope and importance; average production cost; climatic requirements; varieties; seed; soil preferences; preparing the soil for planting; fertilizing; liming; manuring; cultivating; controlling diseases and insects; harvesting, processing, and marketing. In addition, special sections, as may be necessary owing to the peculiarities of individual plants, also are given.

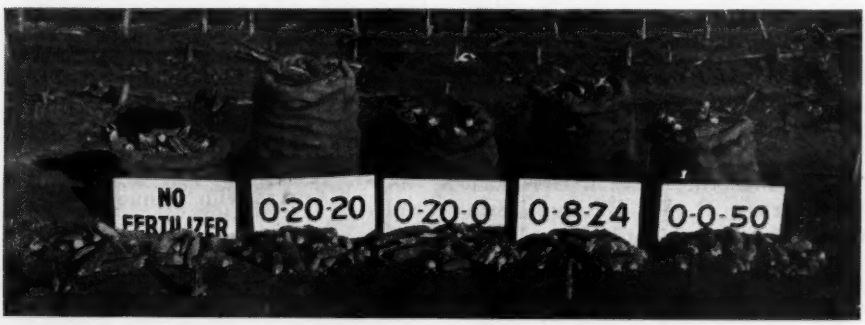
There is a chapter on the home vegetable garden giving practical information on locating, laying out, and planting gardens. Helpful and often elusive information is given in the appendix, which includes the location of the various State Agricultural Experiment Stations, the vitamin contents of individual vegetables, the chemical composition of vegetables, rainfall and frost data for various locations in the Southern States, approximate weights of common vegetable marketing units, and a glossary of technical, chemical, and scientific terms that are likely to be met in literature dealing with vegetable crops and their production.

Potash is Needed in Southern Illinois

(*From page* 11)

the 100 pounds 0-0-50 supplied 50 pounds of actual potash (K_2O) per acre, while the 0-8-24 plot had only 36 pounds of actual potash plant food per acre. It is possible that a 200-pound application of 0-8-24, which would supply nearly as much actual potash (K_2O) as 100 pounds muriate of potash (0-0-50), would have produced a still higher maximum yield. The 0-20-0 alone seemed to give a slight increase in yield both on the Murray field and also at Poorland Farm.

In another section of the Murray field, which had been manured at about 6 tons per acre, some broadcast applications of muriate of potash were made before planting at rates of 85, 275, and 475 pounds per acre. The manured area was yielding about 42.3 bushels per acre, while the unmanured and unfertilized adjacent rows produced but 12.3 bushels of corn. The additional broadcast application of potash increased the yields, but not profitably. No doubt row applications of potash would have been



On the H. J. Heinsman farm, Sandoval, Illinois, a combination of phosphate and potash, as 0-20-20, gave the most profitable yields. No fertilizer—15.3 bu., 76.4% marketable; 125 lb. 0-20-20—27.7 bu., 92.3% marketable.

profitable, and 100 pounds 3-14-6 in addition to manure gave an average increase of about 7.6 bushels of corn per acre.

Where manure is available in large quantities, a farmer may maintain the potash supplies in the soil. It is not possible on most farms in this section to produce sufficient manure from the crops grown to supply 6 to 8 loads per acre for each corn crop. Apparently we shall have to depend on some supplementary applications of commercial fertilizers, especially to supply the potash. Phosphate must be added in some form. In general we have found the addition of raw rock phosphate has been cheaper than superphosphate.

On the J. H. Heinzman farm, where sweet clover was plowed under for corn, the 0-20-20 gave the best returns with a yield of 27.65 bushels. The other yields were as follows: 0-8-24, 24.39 bushels; 0-0-50, 20.26 bushels; 0-20-0, 20.00 bushels; and the unfertilized areas averaged only 14.9 bushels per acre. This field had been limed but has had no rock phosphate. The maximum yields are relatively low due to drouth and chinchbug damage. The important thing to note is that a combination of phosphate and potash in the 0-20-20 gave the maximum production. Phosphate or potash alone each gave an increase of about 5 bushels per acre, but the combination of the two essential plant foods produced over 12 bushels more corn per acre. The 0-20-20 and 0-8-24 plots also produced above 91 per cent marketable corn, while the average of the unfertilized plots showed about 70 per cent marketable corn.

In this field the potash starvation symptoms appeared on the 0-20-0 and unfertilized plots about the middle of the season, but were not as severe as on the Murray field or Poorland Farm.

A test was conducted on the farm of Roy Malan, where former crops had indicated a need for potash. Due to variations of soil conditions within the field, the results of our fertilizer comparisons are not very conclusive. However, it was evident that in one part of the field, where average yields were above 50 bushels, there was little or no definite response to the fertilizer. On one of the less fertile areas of the field, yield estimates on the differently fertilized plots were as follows:

No fertilizer	30.69 bu.
130# 0- 8-24	48.23 "
125# 0-20-20	45.48 "
130# 0-20- 0	36.24 "

Very few symptoms of potash hunger appeared on the corn of the Malan field even on the unfertilized rows in the less fertile areas of the field.

The results of the demonstrations conducted the past season and observations in Marion County for the past 10 years indicate that the growing of legumes for organic matter and nitrogen is the important factor in getting soils into a high state of productivity. It was on those soils where organic matter had been added by sweet clover that the largest responses from the high-potash fertilizers and the greatest maximum yields were obtained.

To grow legumes successfully, the acid soils should be limed at a rate large enough to give a nearly neutral reaction. Sweet clover, a deep-rooted legume, when properly inoculated, will add nitrogen and humus to the soil faster than any other legume that can be grown in this country. Another advantage of sweet clover is that it makes such poor quality hay that there is less temptation for farmers to cut it for hay and sell it rather than to plow the crop down as a green manure. Still another advantage of deep-rooted sweet clover is that more of the nitrogen collected from the air and converted into a form available as plant food is stored in the roots of the plant rather than in the tops, as in some of the more shallow rooted legumes.

On all the fields mentioned above, good yields of corn were secured for a few years after applying limestone and turning under sweet clover or other legumes. Eventually, however, the avail-

able phosphates and the potash were used up by the crops. There is a large supply of potash in the soil in an insoluble form, but apparently the decaying organic matter does not liberate the potash as fast as Dr. C. G. Hopkins and other soil scientists once expected.

The use of sweet clover as a green manure crop apparently increases the need for potash for two reasons. The addition of nitrogen and organic matter improves the yields of following crops. Each ensuing larger crop demands more potash per acre and removes larger quantities from the soil when harvested. When the rate of potash removal by crops exceeds the amount of potash becoming available from soil minerals, then the lack of potash becomes the limiting factor of crop yields. But shall we condemn sweet clover as a green manure now that we may classify it as a "soil robber" as far as potash is concerned? No. The advantages of sweet clover are too great. However, it appears from our observations and fertilizer trials that we shall have to supply potash as well as phosphates to our soils in order to grow maximum yields and profitable crops. Small supplementary fertilizer treatments on corn, and possibly on wheat, will probably maintain and improve the fertility levels of our soils.

Corn seems to need a greater amount of potash than wheat, while wheat responds more to phosphates. Most of our soils have not reached the stage where potash is the limiting element for wheat, since fair yields of wheat are grown without potash fertilization, even on soils where corn is stunted from the lack of this plant food. Phosphates have given good increases in wheat yields, while potash produces somewhat smaller additional improvements in productivity.

Can Sea Island Cotton Return to Georgia?

(*From page* 8)

on which successful yields were obtained, because fairly good yields were obtained on some of the heavier Norfolk sandy loams and Norfolk loamy fine sand. The smallest yields were obtained on the poor sandy soils, such as are found very generally in Echols County. The average yield per acre for all the crops studied was 110 pounds of lint cotton.

Micro-chemical analyses were made of soils on which the crop was grown, with the hope that they would give some lead that would be valuable and furnish some sort of a guide as to what practices farmers might use to assure them of successful crops of Sea Island.

The micro-chemical analysis method of determining the crop and soil needs is new to us in Georgia, and it is necessary to supplement the analyses with a considerable amount of agronomic information in order to be certain of the correct interpretation. Only the nitrate nitrogen content of soils can be determined with the method of analysis which we used, and, since the nitrate content in the soil varies considerably from season to season, it seems that the nitrate content is not as important as the phosphorus and potash content, as well as the pH, or acidity, of the soil.

The most outstanding thing revealed by the micro-chemical analyses of the soil samples was the effect of the potash content of the soils on yield. The average yield on soils which showed less than 100 pounds of K_2O per acre was slightly less than 100 pounds of lint cotton as compared with an average of 156 pounds of lint cotton per acre for soils with 100 pounds or more of K_2O per acre. It can be observed by studying table I that the highest average yields were on soils that ran the highest in K_2O, as shown by the micro-chemical

analyses. There were exceptions. These might be explained by the influence of other factors on yield.

The analyses of some of the soils taken from fields near the coast, which are not shown in table I, may give us a definite lead on many of the soils in the coastal counties. For the few fields tested, the phosphoric acid content was extremely low. There appeared to be an ample amount of potash and an abundance of nitrate in most of the soils. The yield of cotton along the coast, in most cases, was low. A part of the low yield may be due to an insufficient amount of phosphoric acid to balance the nitrogen and potash content of the soils. On some of the coastal soils the nitrogen content was high and both the potash and phosphorus content low. We expect to check on the micro-chemical analyses of the coastal soils by laying out some definite fertilizer demonstrations. Very little experimental data have been obtained for soils in coast counties on which to base fertilizer recommendations for Sea Island cotton or other crops.

According to the best information which can be obtained, the old Sea Island growers did not use much fertilizer on their crop. Many of them used only an application of Kainit, while others used a complete fertilizer. Some agricultural workers are of the opinion that the reason Kainit was so generally used by these growers back in the earlier days was due not only to the potash content of Kainit but because of effects from other ingredients, especially magnesium. Experiments are under way whereby effort is being made to determine the effect on yield of the application of magnesium in the form of dolomitic limestone. Not enough data is available yet on which to draw conclusions.

We saw a great many crops last season which showed signs of having had too heavy applications of nitrogen. In such fields, plants grew as high as 10 feet, making it impossible to dust the cotton for boll-weevil control and causing a good many of the bolls to rot. This condition was aggravated by the very rainy season and by the boll-weevil which kept the plants from setting as much fruit as they would have otherwise.

In order to check further on the 1937 Sea Island crop, we sent out questionnaires to about 600 growers. We asked the growers to fill out the questionnaire, giving complete information on the crop grown in 1937. Of that number, 111 of the questionnaires returned were complete enough for tabulation. The 111 farmers grew 590½ acres. The records came from 19 different counties. The average yield of lint cotton per acre for the 111 growers was 81 pounds. Back in the days before the boll-weevil, the average yield of lint cotton per acre for Sea Island was between 100 and 150 pounds. For 1917 the average yield for Georgia was 125 pounds. Possibly the low yield back in the old days was due to the fact that only small quantities of fertilizers were used.

Of the 111 growers 5.4 per cent had yields from 200 to 252 pounds of lint per acre; 8.1 per cent had yields of 150 to 200 pounds; 20.8 per cent had yields of 100 to 150 pounds; 37.8 per cent had yields of 50 to 100 pounds; 28.8 per cent had yields less than 50 pounds per acre.

The 111 growers indicated that they would plant 250 acres of Sea Island in 1938 as compared with 590½ acres in 1937. The successful growers, that is, those who made yields of 150 pounds or more, indicated that they would plant about the same acreage in 1938 as they did in 1937. Most of the farmers who had yields lower than 150 pounds either stated that they would not plant any in 1938 or that they were undecided whether they would plant any more or not.

Farmers who made yields of 200 pounds of lint cotton or more used an average of 376 pounds of a complete fertilizer per acre as compared with 410 pounds for those making a yield of 150 to 200 pounds; an average of 425 pounds

for those making yields of 100 to 150 pounds of lint; 361 pounds for those making yields of 50 to 100 pounds of lint; and 337 for those farmers making a yield of less than 50 pounds of lint cotton per acre. Yields of Sea Island apparently were not in direct proportion to the amount of fertilizers used. The very rainy season and heavy weevil infestation had a very decided influence on yields. Fields which were liberally fertilized could have made very attractive yields had weather and weevil conditions been more favorable.

crops in the other yield groups, however, were listed as being on pebble land. The yields on some of them were low because of late planting or because of too much rain and other factors. Some good yields were made on very sandy soils, but those soils were not what would be classed as very poor sand. They were considered good, productive soils. On one farm where a large acreage was planted, part of the crop was planted on a heavy pebble soil and the rest of it on sandy soil. The farmer made the statement that the yield on the

TABLE I—RECORD OF SOME SEA ISLAND COTTON GROWERS, 1937 CROP ARRANGED IN ORDER OF YIELD OF LINT COTTON PER ACRE

No. of Record	County	Acres Sea Island	Lbs. Lint Per A.	Kind of Fert.	Lbs. Fert. Per A. at Planting	Kind of Side-Dressing	Lbs. Side-Dressing Per A.	pH	Micro-chemical Analysis		
									Lbs. of Nitrates Per A.	Lbs. of P_2O_5 Per A.	Lbs. of K_2O Per A.
45	Pierce	14	244	8-4-4	300	None	None	6.0	10	103.5	120
60	Chatham	1	243	9-3-5	600	M. Pot.-N. S.	300-150	6.1	24	276	156
6	Lowndes	4	217	10-4-6	400	None	None	6.4	6	184	120
44	Pierce	5½	191	8-4-4	325	"	"	5.8	8	92	120
35	Clinch	3½	180	8-4-4	400	N. Soda	100	5.6	24	46	60
3	Lowndes	3	179	9-3-5	400	Kainit	70	6.2	12	115	144
8	Lowndes	12	170	10-4-6	400	None	None	6	10	115	60
7	Lowndes	10	164	10-4-6	400	"	"	6.2	6	138	108
49	Pierce	8	150	8-4-4	400	"	"	5.5	8	69	48
9	Lowndes	8½	144	10-4-6	400	0-9-10	200	5.3	16	69	144
1-A	Lowndes	75	139	10-4-6	600	10-4-6	200	---	--	---	---
1	Lowndes	--	---	-------	---	-------	-------	5.8	24	195½	144
2	Lowndes	--	---	-------	---	-------	-------	6.0	14	138	96
46	Pierce	4	125	8-4-4	300	None	None	5.8	4	34½	48
52	Pierce	5	120	8-4-4	400	"	"	5.6	20	80.5	48
14 & 15	Echols	20	119	9-3-5	400	"	"	6.0	6	69	60
10	Lowndes	7	117	8-3-5	400	"	"	6.1	20	57.5	60
41	Pierce	2	115	9-3-4	400	0-9-15	100	5.8	16	92	48
37	Clinch	2	113	7-5-5	200	N. Soda	100	5.2	6	27.6	48
47	Pierce	5	112	8-4-4	400	None	None	5.8	6	69	48
11	Lowndes	4	100	10-4-6	300	M. Pot.-N. S.	40-60	5.7	18	46	112.8
43	Pierce	3½	100	9-3-5	400	None	None	5.9	8	69	48
51	Pierce	2	98	8-3-5	400	"	"	6.1	8	207	134
29	Clinch	4	95	8-4-4	400	N. Soda	75	5.5	2	108.5	48
40	Pierce	32	94	8-4-4	300	None	None	5.5	4	92	134.4
25	Echols	3	93	?	400	None	None	6.1	3	57½	60
4	Lowndes	5	90	8-4-4	400	0-9-15	200	5.8	8	211.6	84
16	Echols	3½	88	9-3-5	230	None	None	6.4	5	34½	48
36	Clinch	5	76	8-4-4	400	"	"	5.0	24	34½	48
32	Clinch	2	75	8-3-5	300	"	"	5.2	12	27.6	48
38	Clinch	2	75	8-4-4	---	------	------	5.1	8	46	48
19	Echols	14	72	7-5-5	200	Kainit	100	6.1	2	57½	48
48	Pierce	3½	70	10-4-6	400	None	None	5.7	14	46	48
17	Echols	8	69	8-4-4	200	N. Soda	50	6.0	0.5	138	72

NOTE: Micro-chemical analyses of soil samples were made by C. N. Wilder, Chemist, College of Agriculture, Univ. of Georgia.

As was the case with the crops of Sea Island studied in table I, the type of soil had a very decided influence on yield. Out of the 111 farmers, six of them made yields of 200 pounds of lint or more per acre and all of the six crops were planted on stiff pebble land. Many pebble land was about twice as great as that on his sandy land.

Not more than half of the farmers who returned the questionnaire used any poison to control the boll-weevil. It is rather difficult to obtain any very reliable information as to the effective-

ness of the boll-weevil control measures used, due to the fact that almost daily rains washed the poison off the cotton about as fast as it was applied. However, it was very clearly demonstrated that mopping the cotton with liquid calcium arsenate mixture throughout the season was not nearly so effective as applying calcium arsenate in the form of dust. The mopping method was effective until after squares began to form, but after that time it appeared to be rather inefficient in killing the weevils.

Just what the ultimate outcome will be regarding the production of Sea Island cotton, we cannot foresee; however, we are hopeful that, in the light of experience gained the past 2 years, the more successful growers will demonstrate that it can be grown successfully under weevil conditions. Many farmers succeeded last year under about the worst conditions that South Georgia has ever experienced. If they can succeed bad years, it would seem that they would be still more successful with average weather and weevil conditions. The low grades produced last year as a result of rainy weather and weevil conditions may give some of the consumers of such cotton a rather poor impression of the quality of Georgia Sea Island. It should be remembered that for many years Georgia produced a very fine quality, and with average conditions, we see no reason why high quality Sea Island cannot still be produced.

It Takes Knowledge to Live with Soil

(*From page 19*)

figured on the basis of increasing the yield 150 bushels to the acre at a cost of $5.50," Wheeler reports. "In other sections of the State and on other soils the applications could have been up to 400 or 500 pounds to the acre or even more with profit."

On this particular farm the planting was made on one field on June 18, with fertilizer applied at the time of planting. A band was spread alongside seed pieces. Other later care included seven applications of Bordeaux with calcium arsenate added to the first two spray applications to take care of potato bugs. Applications of 12 loads of manure to the acre before plowing in spring were put on because it was readily available. The farm is a dairy farm, with general diversified production of stock and crops thrown in to make balance. The soil is sandy loam underlain with lime rock, with 220 acres of eight sections of land now tillable.

On muck soils, of which the State has millions of acres scattered in all the important agricultural counties, fertilizer treatments are different. There usually is a greater supply of soil moisture and nitrogen present. Some of the growers use formulas for commercial fertilizer which seem high in phosphorus and potash and perhaps out of balance, but they prove out in yields and profits.

Take the State's new onion king as an example. He is Carl McGuffey, Shelbyville. That's a town more easily located by putting it between Kalamazoo, the celery and paper manufacturing center, and Grand Rapids, famed for furniture in style and volume.

McGuffey's record for onion production in 1937 credits him with growing 1,147 bushels of onions to the acre.

He's modest, but he knows his onions, does McGuffey. When he was 13 he started in onion production with his dad, and he's been at it for 27 years on from 140 up to 225 acres of muck in onions each year.

He uses rye for green manure and fall plows to get good usage from the green manure and allow him to beat other planters in spring by about 10 days. For fertilizer he uses a mixture containing copper sulphate, which he figures is 0-13½-23. The formula closely follows tests and recommendations of soils and fertilizer authorities at Michigan State College. They find that a ratio of about one to two between phosphorus and potash makes the best yields on muck.

McGuffey uses an application of 800 pounds to the acre, applied in thin bands about 5 inches deep on each side of the rows. His onion king title, conferred in an annual meeting of the Michigan Muck Farmers' Association, proves out his methods.

Orchards Differ in Fertilizer Needs

(*From page 17*)

involves the nature of the soil, its depth and topography, its previous treatment, the use of fertilizers and manures, the amount and nature of the cultivation, and the cover or sods grown. Fertilizers are only part of the problem of soil fertility.

"In this orchard any treatment that has influenced the trees at all has done so in the following order: first, the cover crops; perhaps several years later, leaf color; shortly after, branch growth and circumference increase; and last of all, yield.

"The reason for this sequence of results is that the treatments—whether chemical fertilizers, manure, or cover crops—have influenced yields chiefly by changing the organic matter content of the soil; that is, those treatments which have resulted in the production of larger cover crops have ultimately resulted in the production of more fruit.

"A short, non-legume sod rotation is an efficient means of building up a depleted orchard soil. After a sod of any kind becomes thick, tree growth is checked and yields decline. Orchard sods should be turned under, or partially broken, frequently.

"Trees receiving annual tillage with July seeding of cover crops have not done so well as those under sod rotations. If the cover crops are seeded in early June, as has been practiced since 1929, the difference may not be marked."

The following data from the Pennsylvania State College Bulletin indicate what may be expected from the use of a complete fertilizer in an apple orchard to increase cover crop growth as well as tree growth and fruit production. The covers grown in Project 332 during the 24 growing seasons here reported were non-legume covers. The tree yield equals the total pounds of fruit produced per tree in the 24 seasons. Trees were planted in April 1908, so the 1932 crop was harvested after the orchard's 24th growing season.

In Project 332, Plot 9, rows 18-19, NPK, is nearly at the low point, topographically, of the area occupied by this project. Plot 12, rows 24-25, NPK, is nearly at the highest point where the soil is naturally thin. Moreover, the fertilizer treatment in Plot 12 was not begun until 1912, while in Plot 9 it was begun in 1908; this difference probably has had some effect.

Such tree yields speak well for a balanced fertilizer program, and such a program will support covers of legume or non-legume sods of short rotations.

Most orchard owners are interested

EFFECT OF TOPOGRAPHY COMBINED WITH HEAVY FERTILIZATION

	Rows	York	Stayman	Baldwin
Av. green wt. per acre cover crops, 1929–32, pounds	Plot 9, NPK 18–19	13,545	9,191	7,138
	Plot 10, Check 20–21	3,235	4,859	3,300
	Plot 12, NPK 24–25	6,579	10,471	6,192
Total branch growth, 1929–32, inches	NPK 18–19	23.1	25.7	34.4
	Check 20–21	17.9	15.1	15.0
	NPK 24–25	18.0	21.1	25.1
Av. circumference, 1933, inches	NPK 18–19	42.75	42.93	44.83
	Check 20–21	37.56	35.66	31.93
	NPK 24–25	41.41	42.00	41.62
Total yield per tree through 1932, pounds	NPK 18–19	4,457	4,879	5,073
	Check 20–21	4,393	3,818	2,901
	NPK 24–25	4,866	5,418	4,808

to learn that it took 16 years of clean cultivation and late summer seeding of non-legume covers to so deplete this Hagerstown clay-loam soil of organic material and exhaust the nutrients to points low enough to even show in tree growth and yield. Cover growth began to show the need of food in the fifth to seventh year.

In the case of the legume covers, nitrogen was being returned to the soil by the legume plants. This resulted in better covers each year. The trees with legume covers show no need of food, as the picture indicates, after 22 years of growth.

As orchards grow older, the need of complete fertilizers for both the trees and cover crops will become more marked.

Were the Professors Wrong?

(*From page 22*)

acre of an 0-10-4 fertilizer were used under the wheat, and it was top-dressed last March 10 with 100 pounds of nitrate of soda. This wheat will thresh out at least 25 to 30 bushels of grain per acre. But Ray says he knew better than to try to grow it without the potash.

These few random facts are not given to scoff at the professors. They taught then what they thought to be facts, and many other students in the South have been taught the same as I. The effects of this teaching linger today. There are many who believe that little or no potash is needed for ordinary crops on the ordinary red clay soils of our upland piedmont country. The facts prove this to be otherwise. It is not my purpose here to advocate any radical change in the methods of fertilizing, but it is my purpose to point out that many of our good farmers have found that, of necessity, they must use extra amounts of potash fertilizers until they restore the depleted potash content of their red clay lands.

Perhaps the outstanding results which we see secured now in a multitude of field demonstrations may run into a declining scale as the applications of extra potash are continued through the coming years. Be that as it may, there

More than 275 good farmers turn out to study Ray Morrow's pasture demonstration on the farms of H. W. Wilson and L. B. Haas of Iredell County, where Jersey cows get their fill in 2½ hours of grazing daily on grass fertilized with phosphates and potash.

are thousands who yet do not secure the greatest possible acre yields because they do not know about this potash need. Nor will this need be met simply by plowing under legumes, in the hope that the legumes will tend to liberate from the soil the extra potash required for the use of the crops following.

Plowing or disking under legumes is an excellent farming practice which should never be discouraged on any farm, certainly not on the red clay lands of the piedmont South. But this is not the whole answer to the potash problem with these soils. The professors of my student days knew their science and their theories and taught them well. The farmers of today are coming to know that "science when well digested is nothing but good sense and reason," and when they see a fact continuously demonstrated on their own fields, it furnishes them with a dependable guide for future action.

A Dean Retires

(*From page 14*)

national food administrator under President Wilson. Patriotically he accepted this position and also that of chairman of the Missouri Council of Defense. Many remember the days of "Wheat will win the war," "Use fewer pastries and cakes and thereby conserve wheat, lard, and sugar," and "Make a garden if possible." Dean Mumford spent an enormous amount of labor in publicizing and administering this food program. That his work was effective was shown by the fact that Missouri farmers upped production miraculously in a short time. The Country Gentleman said of Mumford's work, "Missouri farmers are making a pig and a half grow where one pig grew before, and they are producing this year almost two grains of wheat to each grain they have been harvesting heretofore."

After his war duties ended, Mumford was named on the Mission Americaine De Rapprochement, a commis-

sion of some 12 university representatives chosen by the French Institute of America to visit the leading French universities and commercial centers with a view to increasing the educational and economic relations between that country and the United States. Mumford was the representative of agriculture and agricultural education on the commission.

As the Missouri college grew in stature and reputation, its dean found himself frequently called upon for national duties. Thus, in 1920 he became a member of the executive committee of the American Association of Land-Grant Colleges and Universities, which position he has held ever since. In this connection he was called upon to write the Purnell Act. This is an important law which provides for annual appropriations to the agricultural experiment stations of the country for scientific research. The act was passed by unanimous vote of both the House and Senate and signed by the president. Mumford also assisted in framing the Bankhead-Jones Act and other important measures for the benefit of agriculture.

Received Recognition

Honorary degrees have come to Mr. Mumford. His alma mater, Michigan State College, conferred upon him the honorary degree of Doctor of Agriculture and at the same time gave a similar degree to his brother, the late H. W. Mumford, Dean of the College of Agriculture of the University of Illinois. At that time mention was made of the similarity of the careers of the two brothers in reaching positions of importance in American agriculture. They were referred to as the "Siamese twins of agriculture."

Dean Mumford also received a degree of Doctor of Agriculture from the University of Nebraska. As much as he appreciated these honors, he has seldom used the title of doctor because it was not an earned degree. He prefers to be called "Dean." Twice Dean Mumford was recommended for the position of secretary of agriculture by Midwestern groups. Whether or not he would have accepted such a position is not known, as he has turned down several commercial offers in order to continue his work in the field of agricultural education. With those of other agricultural leaders, Dean Mumford's portrait hangs in the Saddle and Sirloin galleries at the Union Stock Yards in Chicago.

An Active Man

His 70 years have touched Dean Mumford lightly. While his hair and familiar mustache have grayed, his step is still brisk and his carriage erect. His mind is alert, and he keenly watches over the activities of his institution. He enjoys walking and seldom uses his car to get from his home to his office. If he wishes to talk with any of his staff he frequently walks to see them in place of calling them to his office. Very few Sundays find him absent from the morning service of his church.

In a recent letter to Dean Mumford, Secretary of Agriculture H. A. Wallace said, "Your comprehension of the need for including in the research of the land-grant institutions the study of economic and social factors in agriculture and rural living is reflected in the projects of the experiment stations the country over. Your long and helpful service in the correlation of research as a member of the joint committee of the Land-Grant College Association and the Department is remembered gratefully. And from your demonstration of the nature of true cooperation we have all learned much."

And E. O. Holland, president of the State College of Washington, paid this tribute, "Dean Mumford is recognized as one of the constructive leaders in the great field of agriculture in the United States. He has won for himself an honored place in the councils of the Association of Land-Grant Colleges and Universities. All of the Land-Grant

colleges of the country are the beneficiaries of his fine devotion and constructive leadership."

The man who will succeed to the deanship, Professor M. F. Miller, has established his reputation in the study of soils. That it should be in such a field is natural, for he has great love and reverence for the soil—feelings which show in his constant effort to convince others of the importance of saving and protecting the basis of all agriculture. Many years before the words, soil conservation, became generally used, Professor Miller was stressing the idea in his research and in his teachings.

He long realized the great damage being done to the soil by rainfall erosion, but found that he needed some actual figures to convince many people of something that was happening before their eyes. So in 1917, he set up plots from which the amount of erosion occurring under normal conditions could be measured. The results of this investigation were so startling that they called the attention not only of farmers but also of other soil students to the enormous amount of loss. In commenting on these experiments Dr. H. H. Bennett, chief of the Soil Conservation Service, recently said, "These plots were the birthplace of soil conservation in the United States."

Miller's path led him from a farm in Ohio, through Ohio State University, and then to Cornell University for an advanced degree. Next he went on to the position of field assistant in the Bureau of Soils. Back to Ohio State he came in 1904 to become connected with the department of agronomy. After 10 years there, he joined the Missouri College's faculty in 1914 and rose to become chairman of the soils department and assistant dean.

Though his soil erosion work has been important, he has by no means limited himself to this type of investigation. The effect of fertilizers on soils, the effect of cultivation on plant nutrients, the nitrogen relationship of the soil, the rate of accumulation of organic matter are only a few of the subjects in which he has headed vital research.

Professor Miller long has been a believer in knowing the kinds of soils with which he and the people of his State had to deal. So he has conducted thorough-going surveys—surveys which came to be regarded as standard patterns for similar work in other States. His work did not lack appreciation by others engaged in similar activities throughout the nation, for the American Soil Survey Association chose him to be president. A similar honor came from the agronomists of the nation when they selected him to serve as president of the American Society of Agronomy. In addition to writing a large number of agricultural bulletins and articles for technical publications, Professor Miller is the author of a textbook, "The Soil and Its Management."

Landsc(r)aping

(*From page* 5)

bus out on the adjacent back roads. My theory is that the safest shrubs for *my* bower are those which thrive without much tender care. Accordingly, I uproot the lowly sumac, the hawthorne, and the wild crab—with or without permission. If I discover an old homestead wall somewhere with lilac bushes and syringas growing there, they become my property. Then I take them home and call in the plumber, the garage mechanic, and the garbage collector, and with their advice I chuck the purloined shrubs into proper juxta-

position. One secures in this manner a nifty element of *sang-froid* and a racy effect of *laissez-faire* not possible when you are slavishly copying arboreal hints by Liberty Hyde Bailey.

Our little middle-class gardens appease the palate, appeal to the perceptions, promote physical welfare, and protect the purse. Much of these things my garden has done for me at least, and it has also kept me from falling victim to the golf craze—although a country club with a professional instructor and a prodigious debt is located half a mile distant. No, I have never perfected a stance. I prefer to do my sod chopping where it will be of some normal use. My leathery coat of tan and my wife's fresco of freckles have been acquired right on our own fairways of bucolic content.

NORTHERN gardening on old soils amid the breeding grounds of all the insects known to the State entomologist is a great thing for stamina as well as sunburn. Despite lice on my turnips and slugs on my tomatoes, despite long winters and short asparagus, I would not trade my honest hours with the hoe for all the largess of the tropic zones. They tell me that the flowers of the orient and the equatorial regions are often bold and flashy like some overdressed vixen, but highly unsatisfactory from the aesthetic viewpoint. They are said to be fat and luscious, and either smell too rank or not at all—while most of our old favorites are personal and sort of affectionate. The overfed, easy-living tropical blossoms are usually gross and bestial. Up here the tough battle which the flowers have to undergo from weather on one hand, and chaps like me fooling around on the other hand, is apparently all they need to make them charming.

Landscaping and country gardening appeal to lots of philosophers because they embody the oldest arts of man and always carry something new and worth striving for. The first man and woman set up housekeeping in the Garden of Eden and the most tragic sorrow of the universe occurred in the Garden of Gethsemane. Archaeologists digging into the sites of ancient cities discover traces of garden ornaments, and our own red brothers cultivated the humble kitchen garden long before we led him astray with corn whisky.

Many a colonial patriot probably objected to leaving his garden duties long enough to put his spluttering signature to the Declaration of Independence. Our brave New England mothers found that sage, pennyroyal, rosemary, mint, and rambling roses were reminders of home ties severed forever, and their own pioneering daughters treasured bulbs, seeds, and corms in their lonely trek across the prairies to found our western empire, where these plants stirred within them old memories of cozy eastern homesteads. Gardening is in our blood, but the most unhappy are those who must do it by proxy instead of soiling their mitts.

I THOROUGHLY enjoy attending a convention of landscapers and horticultural experts. To be sure and to be frank, I go there to "gawp" and smell more than I do to listen with intelligence to their ordinary conversation and platform remarks.

I surely try hard to appear discerning and appreciative while strolling down the bosky aisles of the flower show with the lady secretary of the Nineteenth Ward Home Grounds Circle and the bespectacled herb shark from the State society. I dare not confess openly that I scarcely know more about their jargon than I do about balancing the government's budget or my own.

"Notice the exquisite blend of color in that fine *Aquilegia,*" remarks the plant phrenologist, and I look over my shoulder at the geraniums when I should have nodded with deep conviction at the columbines. Or the learned

lady finally catches me off base by naively inquiring whether I prefer *Lilium candidum* or *Lilium superbum,* and all I can stutter back is "I always admired lily of the valley most."

Personally I might pick a fuss with the American Joint Committee on Horticultural Nomenclature if I knew enough to begin it. But it's a wise guy who stops fighting before he starts along lines where he is not familiar. Why the dickens some folks insist on calling "baby's breath" by the cognomen, "Gypsophila," or mother's old favorite, the "bleeding heart," under the disguise of "Dicentra" and forget-me-nots as "Myosotis" seems to me like making it tougher for us rough-necks to get real chummy with culture and good influences.

I DEEM it rather risky business, too, for if a tyro gets verbal orders to whack off *Polygonum aviculare* and he mows down *Polygonatum giganteum* through mistaken intensity, his cultured frau will be the first one to horrify his harassed soul with the shocking news that he doesn't know knotweed from Solomon's-seal.

The good old English language should be used in back-fence conversation in private home gardens, and let the Latin version be saved for high mass among the horticulturists, or pink teas in the sewing circle.

Some day if I get much more of this into my system, I shall cross a sunflower with a skunk cabbage and then dare anybody to malign it with the title, *Jeffersonimus Macdermidicum.*

Yet, taking the whole subject into consideration, the improvement of the domestic landscape earns my lasting support and commendation. This should be a great boon to the industry alone.

For as I observe the trend outward from narrow flats and small city lots into wider and greener spaces by those able to afford either site with relative ease, it strikes me we are bound to raise a generation of youth with finer sensibilities and a fundamental attitude toward lasting values which some of the older generations lost in the rush for land conquest and profits.

It is no longer the retired gentleman and his lady who cultivate the sod and make the home arbor glorious to see. It is no longer an exception in the open country to see a farmstead taking pride in its drives, walks, and flower borders. Something which roots deep and expands in our natures has taken hold of us, altering for a little at least our coarse scramble for the financial rewards at the cost of psychic enjoyments. And as the chief cost lies in muscular effort and common sense, plus as much study as one would put into a capable game of bridge, there are mental and physical returns involved that weigh well in the balance.

It now devolves upon us to find a way to extend the privileges of this communion with nature and the arts of plant culture to the submerged groups in some form or other. Maybe some disguised form of WPA or PWA is the answer here, making little difference on party lines I am sure—so long as we get the green goods growing.

THEN when that time arrives I need not pull down the window shades of the parlor car when riding into old Chicago or approaching old Atlanta, for fear of seeing too much of the ash heaps of the underworld. And it will do us as much good as any national movement I am aware of, and probably put some ginger into the circulation business—both of money and blood. A chap who can grab a hoe and chop the stuffing out of some quack-grass encroaching on his violets is not apt to seize a torch and set fire to the courthouse.

So let my blessing descend in peace and comfort upon all those myriads of votaries of the landscape arts who assiduously tend to their grubbing. And mayhap I'd better get busy myself and let you do the same!

MASCULINE PRIDE

Recently, in the French Parliament, one of the Deputies, making a speech urging the improvement of the legal status of women, cried: "After all, there's very little difference between men and women!"

With one accord, the entire Chamber of Deputies rose and shouted as one man: "VIVE LA DIFFERENCE!"

"Bredren, we must do something to remedy de Status Quo," said a negro preacher to his congregation.

"Brudder Jones, what am de Status Quo?" asked a member.

"Dat, my brudder," said the preacher, "am Latin for de mess we's in."

CHILD PRODIGY

Little Lucy had just returned from the children's party and had been called into the living room to be exhibited before the tea guests.

"Tell the ladies what mama's little darling did at the party," urged the proud mother.

"I frowed up," said little Lucy.

He (driving): "I always keep both hands on the steering wheel."

She (sourly): "Well, I'm right here in case you need a handkerchief."

"Did you see my new girl?"

"Yes."

"How did she strike you?"

"We didn't get that well acquainted."

Drunk, hanging to a piling at the foot of Ocean Street: "Shay, what's that bright thing down there in the water?"

Lounging sailor: "Why, that's the moon."

Drunk: "Then please tell me how the 'ell I got up here!"

THEIR OWN PROBLEM

"Say, Josh, how can you tell the ganders from the geese?"

"Oh, we never worry about that. We just turn them all out together and let them figure that out for themselves."

Mrs. McWhuskey (watching a loving couple): "Et's just disgustin'. I'm verra glad ye didna make sic a fool o' yersel' when ye were walkin' oot wi' me, Sandy."

Mr. McWhuskey: "Ye manna juidge, wife. I hadna the same provocation."

MARKS OF IDENTITY

"No, I don't know where my wife is. But wherever she is, she has a cigarette in one hand and a weak no-trump in the other."

"So your name is George Washington?" the old lady asked the small colored boy.

"Yessum."

"And you try to be exactly like him, or as nearly as possible?"

"Lak who?"

"Why, like George Washington."

"Ah kaint help bein' lak Jahg Washin'ton, 'cause dat's who ah is."

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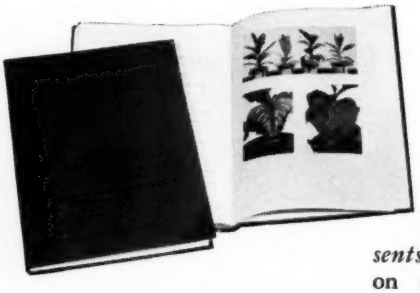

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